Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth Bosch Group

# Rexroth IndraControl VCH 08.1

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## Project Planning Manual

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# 1 System Presentation

## 1.1 Overview

The hand-held terminal IndraControl VCH 08.1 is a portable operation and visualization device of rugged design with Windows CE compatible electronics. Through its use of a powerful processor and configuration with ethernet, the hand-held terminal IndraControl VCH 08.1 is ideally equipped for a variety of applications (see chapter 2.1 "Appropriate Use " on page 5).

Instead of rotating mass storage devices such as floppy discs and hard drives, which are not suitable for rough operating conditions, the IndraControl VCH 08.1 contains FLASH- and RAM databases.

The IndraControl VCH 08.1 offers a Windows CE platform which can be equipped with applications using the VI Composer.

Through its optional operation and control elements, the IndraControl VCH 08.1can be easily adapted to individual cases of operation.

The IndraControl VCH 08.1 is, for example, suited to the following areas of application:

- Operation and visualization of IndraLogic, IndraMotion MLC and IndraMotion MTX.
- Installation of machines and systems.
- Operation and diagnosis of extended handling systems.
- Visualization of simple operating fields on assembly lines.

For the normal operating modes, the "automatic" mode of operation is available, for instance.

In the special modes of operation, such as semi-automatic and manual, the options of installation, teaching, test runs and other functions are available.

An acceptance unit and also a STOP switch are installed in the IndraControl VCH 08.1 as safety functions.

Manual operation terminals that are intended for temporary connection do not need to have a red-yellow emergency stop switch. A manual operation terminal with a gray STOP switch is available for this use case.

All of the safety functions are designed as dual circuits to ensure compliance with safety category 4 according to EN 954-1.

The selection of the manual operating terminal which is suited to the machine and the project planning of the possible additional options must be completed under the responsibility of the machine manufacturer and on the basis of a statutory evaluation of the dangers and risks.

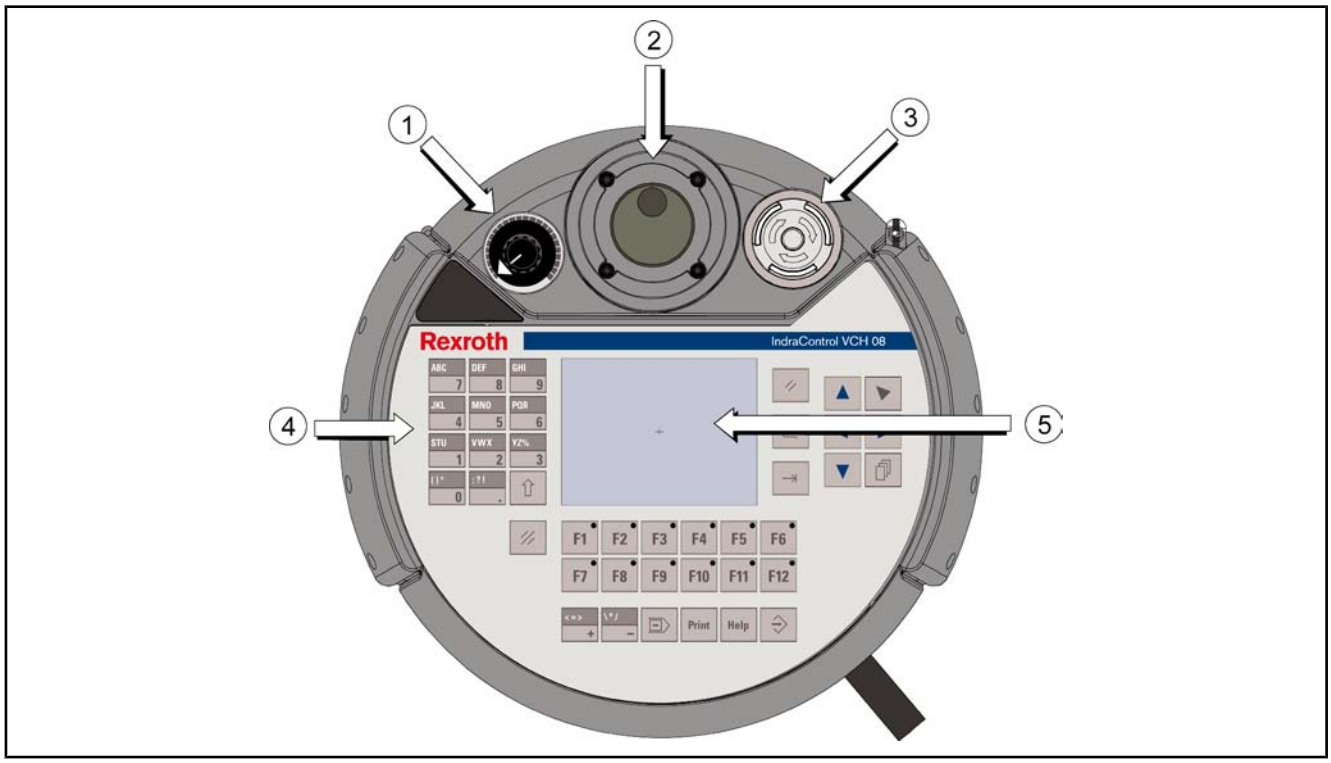
## 1.2 Casing

The vibration and shock-proof casing consists of fire resistant material (UL 94-V0). It is impact resistant and resistant to water, cleaning agents (alcohols and tensides), oils, cutting oils (drilling oils), grease and lubricants. The double walled and extremely robust casing has been tested with a free fall onto an industrial floor from a height of 1.5 m.

## 1.3 Keypad

The keypad consists of a chemical resistant polyester film which is equipped with embossed keys.

# 1.4 Front View of the IndraControl VAC 08.1




① Installation point for the override potentiometer
② Installation point for electronic hand wheel
③ Emergency STOP key, dual circuit, or STOP push button
④ Keypad
⑤ Display

*Fig.1-1: Front view of the IndraControl VAC 08.1*

# 1.5 Front View of the IndraControl VAC 30.2

The hand-held terminal IndraControl VCH 08.1 is connected with the controller via the IndraControl VAC 30.2 connection module. All of the connections for wiring the connection module with the controller are located on the rear side of the IndraControl VAC 30.2. At the front side, a 17pin female connector with a screw top enables the easy connection of a IndraControl VCH 08.1.

*Fig. 1-2: Front view of the VAC 30.2*

## 1.6 Operating System

For license related reasons IndraControl VCH 08.1 -type devices are only supplied with previously installed operating systems. For further information about the operating system, please refer to chapter 9 "Software" on page 57.

## 1.7 Start up

Mount the IndraControl VAC 30.2 connection module according to the instructions in chapter 5 "Dimensions" on page 23. Next, connect the connection module to the power supply, the STOP circuit, the enabling circuit and to the network.

Before starting up the IndraControl VCH 08.1 the operator must ensure that the system, and especially the safety equipment, is in correct working order.

☞ Before starting up the IndraControl VCH 08.1 it must be ensured that the STOP push button is **not** depressed. The connection of a IndraControl VCH 08.1 with a depressed STOP push button would shut down the system.

To connect the IndraControl VCH 08.1, without applying any force, fit the angled connector onto the flange of the VAC 30.2 connection module at an angle of 45° (to horizontal); refer tofig. 1-3 "Plug orientation at the IndraControl VAC 30.2" on page 4. The correct position is only achieved if the connector snaps in to place properly. Now turn the knurled nut on the flange, applying a little pressure.

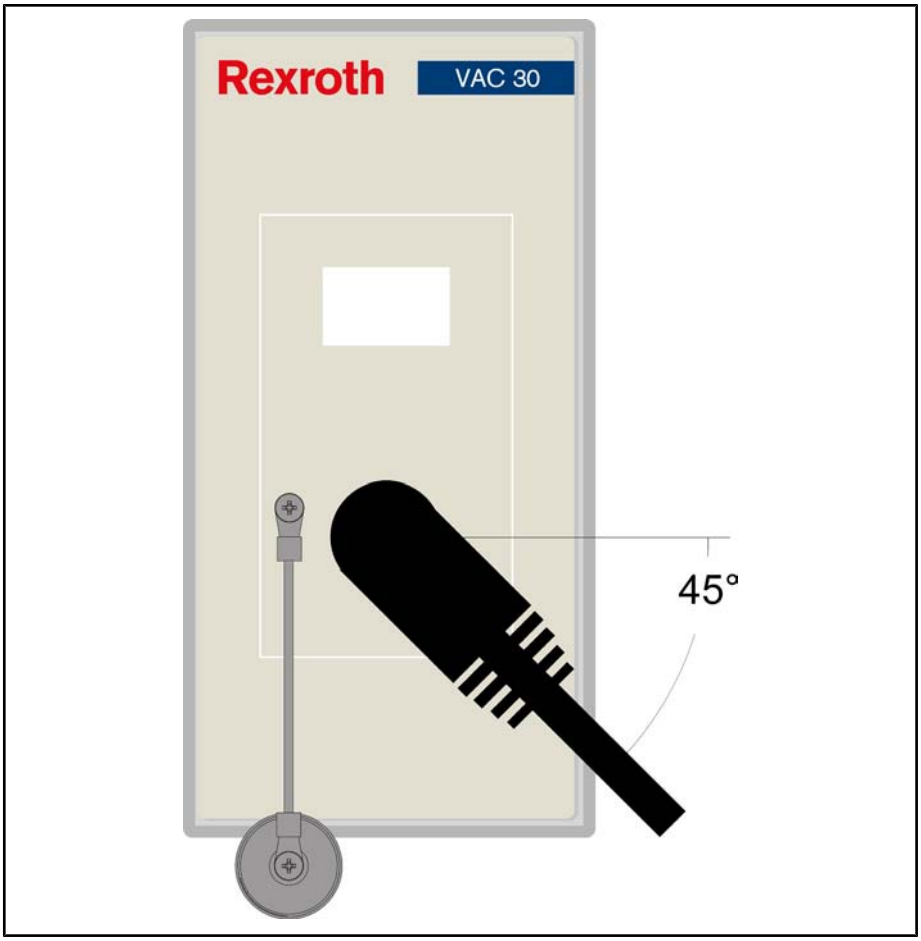



*Fig.1-3: Plug orientation at the IndraControl VAC 30.2*

☞ While the connector is being screwed on, a relay activates the STOP push button. This ensures that the IndraControl VCH 08.1 is supplied with power. To ensure the optimal connection of the contacts and to achieve the specified degree of protection, screw the knurled nut until the rubber seal is completely covered and the end position is reached.

During the starting up of the IndraControl VCH 08.1 and during routine operation, regularly check all three positions of the enabling device on both sides for correct functioning.

The device may only be started up and connected by appropriately qualified staff.

The device and systems manufacturer provides further details about the start-up in their documentation.

# 2 Important Instructions for Use

## 2.1 Appropriate Use

### 2.1.1 Introduction

Rexroth products are developed and manufactured in accordance with the latest technologies. They are tested prior to delivery for their safe operation and reliability.

The products may only be used appropriately. If the use is inappropriate, situations may arise which can cause both physical damage as well as damage to property.

☞ As a manufacturer, Rexroth is unable to undertake any guarantee, liability or payment of compensation pertaining to damages caused by the inappropriate use of its products. The user is solely responsible for all risks resulting from the products which are not used as intended.

Before you use Bosch Rexroth products, the following requirements must be fulfilled in order to guarantee the appropriate use of the products:

- Anyone handling a Rexroth product in any way must read and understand the corresponding safety instructions as well as the instructions on appropriate use.
- Hardware products must remain in their original state, in other words, no modifications regarding their design may occur. Software products may not be decompiled and their source codes may not be modified.
- Damaged or faulty products may not to be installed or put into operation.
- It must to be ensured that the products are installed according to the specifications whcih are set out in the documentation.

### 2.1.2 Areas of Use and Application

The hand-held terminalIndraControl VCH 08.1 is a PC-based operation and visualization device that can also complete control functions depending on the application and configuration.

☞ The hand-held terminalIndraControl VCH 08.1 may only be used with the accessories and add-ons which are specified in this documentation. Components which are not explicitly named may neither be added nor connected. The same applies to cables and wires.

☞ Operation my only be carried out in the specified configurations and combinations of the components and with the software and firmware stated in the corresponding functional descriptions.

The hand-held terminalIndraControl VCH 08.1 has been developed for use in control tasks.

Typical areas of application for the hand-held terminalIndraControl VCH 08.1:

- Handling systems and assembly systems,
- packaging and food processing machines,
- printing and paper processing machines, and
- machine tools.

IndraControl VCH 08.1 - type devices may only be operated under the assembly conditions and installation conditions, in the specified purpose and under the specified ambient conditions (temperature, protection type, humidity, EMC etc.) which are stated in this documentation.

## 2.2 Inappropriate Use

The use of the hand-held terminalIndraControl VCH 08.1 outside the specified areas of application or under operating conditions which deviate from the operating conditions and technical data specified in the documentation is considered to be "inappropriate".

The hand-held terminalIndraControl VCH 08.1 may not be used if

- it is exposed to operating conditions that do not fulfill the sepcified ambient conditions. For example, operation under water, under extreme fluctuations of temperature and extremely high temperatures
- which are not exlicitly approved for the application of Bosch Rexroth products are not permitted. Please read the information which is stated in the general safety instructions.

# 3 Safety Instructions for Electric Drives and Controls

## 3.1 Safety Instructions - General Information

### 3.1.1 Using the Safety Instructions and Passing them on to Others

Do not attempt to install or commission this device without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation prior to working with the device. If you do not have the user documentation for the device, contact your responsible Bosch Rexroth sales representative. Ask for these documents to be sent immediately to the person or persons responsible for the safe operation of the device.

If the device is resold, rented and/or passed on to others in any other form, these safety instructions must be delivered with the device in the official language of the user's country.

WARNING

**Improper use of these devices, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in material damage, bodily harm, electric shock or even death!**

Observe the safety instructions!

### 3.1.2 How to Employ the Safety Instructions

Read these instructions before initial commissioning of the equipment in order to eliminate the risk of bodily harm and/or material damage. Follow these safety instructions at all times.

- Bosch Rexroth AG is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before commissioning the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation, as well as care in operation and maintenance, are prerequisites for optimal and safe operation of this device.
- Only assign trained and qualified persons to work with electrical installations:
  - Only persons who are trained and qualified for the use and operation of the device may work on this device or within its proximity. The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the product, as well as an understanding of all warnings and precautionary measures noted in these instructions.
  - Furthermore, they must be trained, instructed and qualified to switch electrical circuits and devices on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.
- Only use spare parts and accessories approved by the manufacturer.

- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The devices have been designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Only use safety-relevant applications that are clearly and explicitly approved in the Project Planning Manual. If this is not the case, they are excluded. Safety-relevant are all such applications which can cause danger to persons and material damage.
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.

  The machine and installation manufacturer must

  – make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
  – make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Commissioning of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.
- Operation is only permitted if the national EMC regulations for the application are met.
- The instructions for installation in accordance with EMC requirements can be found in the section on EMC in the respective documentation (Project Planning Manuals of components and system).

  The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.
- Technical data, connection and installation conditions are specified in the product documentation and must be followed at all times.

*National regulations which the user must take into account*

- European countries: according to European EN standards
- United States of America (USA):
  – National Electrical Code (NEC)
  – National Electrical Manufacturers Association (NEMA), as well as local engineering regulations
  – regulations of the National Fire Protection Association (NFPA)
- Canada: Canadian Standards Association (CSA)
- Other countries:
  – International Organization for Standardization (ISO)
  – International Electrotechnical Commission (IEC)

### 3.1.3 Explanation of Warning Symbols and Degrees of Hazard Seriousness

The safety instructions describe the following degrees of hazard seriousness. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions:

| Warning symbol | Signal word | Degree of hazard seriousness acc. to ANSI Z 535.4-2002 |
|---|---|---|
| | Danger | Death or severe bodily harm will occur. |
| | Warning | Death or severe bodily harm may occur. |
| | Caution | Minor or moderate bodily harm or material damage may occur. |

*Fig.3-1: Hazard classification (according to ANSI Z 535)*

## 3.1.4 Hazards by Improper Use

DANGER

**High electric voltage and high working current! Risk of death or severe bodily injury by electric shock!**

Observe the safety instructions!

DANGER

**Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!**

Observe the safety instructions!

WARNING

**High electric voltage because of incorrect connection! Risk of death or bodily injury by electric shock!**

Observe the safety instructions!

WARNING

**Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!**

Observe the safety instructions!

CAUTION

**Hot surfaces on device housing! Danger of injury! Danger of burns!**

Observe the safety instructions!

CAUTION

**Risk of injury by improper handling! Risk of bodily injury by bruising, shearing, cutting, hitting or improper handling of pressurized lines!**

Observe the safety instructions!

CAUTION

**Risk of injury by improper handling of batteries!**

Observe the safety instructions!

## 3.2 Instructions with Regard to Specific Dangers

### 3.2.1 Protection Against Contact with Electrical Parts and Housings

☞ This section concerns devices and drive components with voltages of **more than 50 Volt**.

Contact with parts conducting voltages above 50 Volts can cause personal danger and electric shock. When operating electrical equipment, it is unavoidable that some parts of the devices conduct dangerous voltage.

DANGER

**High electrical voltage! Danger to life, electric shock and severe bodily injury!**

- Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain and repair this equipment.
- Follow general construction and safety regulations when working on power installations.
- Before switching on the device, the equipment grounding conductor must have been non-detachably connected to all electrical equipment in accordance with the connection diagram.
- Do not operate electrical equipment at any time, even for brief measurements or tests, if the equipment grounding conductor is not permanently connected to the mounting points of the components provided for this purpose.
- Before working with electrical parts with voltage potentials higher than 50 V, the device must be disconnected from the mains voltage or power supply unit. Provide a safeguard to prevent reconnection.
- With electrical drive and filter components, observe the following:

  Wait **30 minutes** after switching off power to allow capacitors to discharge before beginning to work. Measure the electric voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.
- Never touch the electrical connection points of a component while power is turned on. Do not remove or plug in connectors when the component has been powered.
- Install the covers and guards provided with the equipment properly before switching the device on. Before switching the equipment on, cover and safeguard live parts safely to prevent contact with those parts.
- A residual-current-operated circuit-breaker or r.c.d. cannot be used for electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device according to the relevant standards.
- Secure built-in devices from direct touching of electrical parts by providing an external housing, for example a control cabinet.

☞ For electrical drive and filter components with voltages of **more than 50 volts**, observe the following additional safety instructions.

DANGER

**High housing voltage and high leakage current! Risk of death or bodily injury by electric shock!**

- Before switching on, the housings of all electrical equipment and motors must be connected or grounded with the equipment grounding conductor to the grounding points. This is also applicable before short tests.
- The equipment grounding conductor of the electrical equipment and the devices must be non-detachably and permanently connected to the power supply unit at all times. The leakage current is greater than 3.5 mA.
- Over the total length, use copper wire of a cross section of a minimum of 10 $mm^2$ for this equipment grounding connection!
- Before commissioning, also in trial runs, always attach the equipment grounding conductor or connect to the ground wire. Otherwise, high voltages may occur at the housing causing electric shock.

## 3.2.2 Protection Against Electric Shock by Protective Extra-Low Voltage

Protective extra-low voltage is used to allow connecting devices with basic insulation to extra-low voltage circuits.

All connections and terminals with voltages between 5 and 50 volts at Rexroth products are PELV systems. [1] It is therefore allowed to connect devices equipped with basic insulation (such as programming devices, PCs, notebooks, display units) to these connections and terminals.

WARNING

**High electric voltage by incorrect connection! Risk of death or bodily injury by electric shock!**

If extra-low voltage circuits of devices containing voltages and circuits of more than 50 volts (e.g. the mains connection) are connected to Rexroth products, the connected extra-low voltage circuits must comply with the requirements for PELV. [2]

## 3.2.3 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of connected motors. Some common examples are:

- improper or wrong wiring of cable connections
- incorrect operation of the equipment components
- wrong input of parameters before operation
- malfunction of sensors, encoders and monitoring devices
- defective components
- software or firmware errors

Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

1) *"Protective Extra-Low Voltage"*

2) *"Protective Extra-Low Voltage"*

The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily harm and material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

DANGER

**Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!**

- Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation.

  These measures have to be provided for by the user according to the specific conditions within the installation and a hazard and fault analysis. The safety regulations applicable for the installation have to be taken into consideration. Unintended machine motion or other malfunction is possible if safety devices are disabled, bypassed or not activated.

**To avoid accidents, bodily harm and/or material damage:**

- Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:
  - use safety fences
  - use safety guards
  - use protective coverings
  - install light curtains or light barriers
- Fences and coverings must be strong enough to resist maximum possible momentum.
- Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the device if the emergency stop is not working.
- Isolate the drive power connection by means of an emergency stop circuit or use a safety related starting lockout to prevent unintentional start.
- Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone.
- Additionally secure vertical axes against falling or dropping after switching off the motor power by, for example:
  - mechanically securing the vertical axes,
  - adding an external braking/ arrester/ clamping mechanism or
  - ensuring sufficient equilibration of the vertical axes.
- The standard equipment motor brake or an external brake controlled directly by the drive controller are **not sufficient to guarantee personal safety**!
- Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:
  - maintenance and repair work
  - cleaning of equipment
  - long periods of discontinued equipment use
- Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such devices cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.

## 3.2.4 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated by current-carrying conductors and permanent magnets in motors represent a serious personal danger to those with heart pacemakers, metal implants and hearing aids.

WARNING

**Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!**

- Persons with heart pacemakers and metal implants are not permitted to enter following areas:
  - Areas in which electrical equipment and parts are mounted, being operated or commissioned.
  - Areas in which parts of motors with permanent magnets are being stored, repaired or mounted.
- If it is necessary for somebody with a pacemaker to enter such an area, a doctor must be consulted prior to doing so. The noise immunity of present or future implanted heart pacemakers differs greatly so that no general rules can be given.
- Those with metal implants or metal pieces, as well as with hearing aids, must consult a doctor before they enter the areas described above. Otherwise health hazards may occur.

## 3.2.5 Protection Against Contact with Hot Parts

CAUTION

**Hot surfaces at motor housings, on drive controllers or chokes! Danger of injury! Danger of burns!**

- Do not touch surfaces of device housings and chokes in the proximity of heat sources! Danger of burns!
- Do not touch housing surfaces of motors! Danger of burns!
- According to the operating conditions, temperatures can be **higher than 60 °C**, 140°F during or after operation.
- Before accessing motors after having switched them off, let them cool down for a sufficiently long time. Cooling down can require **up to 140 minutes**! Roughly estimated, the time required for cooling down is five times the thermal time constant specified in the Technical Data.
- After switching drive controllers or chokes off, wait 15 minutes to allow them to cool down before touching them.
- Wear safety gloves or do not work at hot surfaces.
- For certain applications, the manufacturer of the end product, machine or installation, according to the respective safety regulations, has to take measures to avoid injuries caused by burns in the end application. These measures can be, for example: warnings, guards (shielding or barrier), technical documentation.

## 3.2.6 Protection During Handling and Mounting

In unfavorable conditions, handling and mounting certain parts and components in an improper way can cause injuries.

CAUTION

**Risk of injury by improper handling! Bodily injury by bruising, shearing, cutting, hitting!**

- Observe the general construction and safety regulations on handling and mounting.
- Use suitable devices for mounting and transport.
- Avoid jamming and bruising by appropriate measures.
- Always use suitable tools. Use special tools if specified.
- Use lifting equipment and tools in the correct manner.
- If necessary, use suitable protective equipment (for example safety goggles, safety shoes, safety gloves).
- Do not stand under hanging loads.
- Immediately clean up any spilled liquids because of the danger of skidding.

## 3.2.7 Battery Safety

Batteries consist of active chemicals enclosed in a solid housing. Therefore, improper handling can cause injury or material damage.

CAUTION

**Risk of injury by improper handling!**

- Do not attempt to reactivate low batteries by heating or other methods (risk of explosion and cauterization).
- Do not recharge the batteries as this may cause leakage or explosion.
- Do not throw batteries into open flames.
- Do not dismantle batteries.
- When replacing the battery/batteries do not damage electrical parts installed in the devices.
- Only use the battery types specified by the manufacturer.

☞ Environmental protection and disposal! The batteries contained in the product are considered dangerous goods during land, air, and sea transport (risk of explosion) in the sense of the legal regulations. Dispose of used batteries separate from other waste. Observe the local regulations in the country of assembly.

## 3.2.8 Protection Against Pressurized Systems

According to the information given in the Project Planning Manuals, motors cooled with liquid and compressed air, as well as drive controllers, can be partially supplied with externally fed, pressurized media, such as compressed air, hydraulics oil, cooling liquids and cooling lubricating agents. Improper handling of the connected supply systems, supply lines or connections can cause injuries or material damage.

CAUTION

**Risk of injury by improper handling of pressurized lines!**

- Do not attempt to disconnect, open or cut pressurized lines (risk of explosion).
- Observe the respective manufacturer's operating instructions.
- Before dismounting lines, relieve pressure and empty medium.
- Use suitable protective equipment (for example safety goggles, safety shoes, safety gloves).
- Immediately clean up any spilled liquids from the floor.

☞ Environmental protection and disposal! The agents used to operate the product might not be economically friendly. Dispose of ecologically harmful agents separately from other waste. Observe the local regulations in the country of assembly.

# 4 Technical Data

## 4.1 IndraControl VCH 08.1

| | |
|---|---|
| **Processor** | Intel PXA 270/416 MHz |
| **Random access memory (RAM)** | SDRAM: max. 64 MB |
| **Flash memory** | 64 MB |
| **Interfaces** | 1 x Ethernet connection (RJ 45, 10/100 Base-T),<br>USB-Client in cable duct (Debug and ActiveSync Device) |
| **Casing material** | ABS, resistant to grease, oils, lubricants, alcohol, etc. |
| **Degree of protection** | IP 65 |
| **Power supply** | 24 VDC |
| **Input voltage range** | 24 VDC (+19.2 VDC to +30 VDC according to EN 61131-2) |
| **Max. inrush current:** | 5.6 A (current limiting available) |
| **Prescribed external protection** | 2 A time-lag safety fuse |
| **Max. power consumption at maximum configuration** | 4.8 W (200 mA at 24 VDC) |
| **Protection class** | III according to EN 61131-2 and/or EN 50178 |

*Fig.4-1: Technical data of the IndraControl VCH 08.1*

## 4.2 Keypad, Casing and Display

| | |
|---|---|
| **Display** | 3.8" (76.8 x 57.6 mm) STN, back lit LC display, 320 x 240 Pixel 262, 5 gray shades |
| **Keypad type** | membrane keypad with tactile feedback<br>key control panel designed for thumb operation<br>operation suitable for left and right handed persons |
| **Number of keys** | 40 membrane keys with mechanical pressure points |
| **Display components** | 12 status LEDs |
| **Front panel surface** | color: RAL 7035 light gray |
| **Degree of protection** | front panel IP 65 according to EN 60529, IEC 60529 |
| **Dimensions** | diameter: 250 mm<br>total height, including handle: 114 mm |
| **Fire resistance** | UL94-V0 |
| **Standard operating elements** | two three-stage enabling switches, double-circuit, externally wired<br>STOP push button, dual circuit, externally wired |
| **Operating elements** | electronic hand wheel, internally wired<br>override potentiometer, internally wired |

*Fig.4-2: Technical data, front side of the IndraControl VCH 08.1*

## 4.3 STOP Push Button

| | |
|---|---|
| **Nominal voltage** | 24 VDC |
| **Prescribed external fusing** | 2 A time-lag safety fuse |

Technical Data

| | |
|---|---|
| **Minimum current** | 10 mA (per contact) |
| **Maximum current load** | 1,000 mA (per contact) |
| **Utilization category** | DC-13 (according to IEC 60947-5-1) |

*Fig.4-3: Technical data of the STOP push button*

## 4.4 Enabling Device

| | |
|---|---|
| **Nominal voltage:** | 24 V DC (voltage tolerance 19.2 V DC to 30 V DC according to EN 61131-2) |
| **Nominal current:** 1) | max. 500 mA |
| **Prescribed external fusing** | 2 A time-lag safety fuse |
| **Operating cycles** | switch position 2: $10^5$<br>switch position 3: 5 x $10^4$ |
| **output type** | solid state output |
| **Maximum breaking current** | circuit 1: 1.5 A<br>circuit 2: 0.8 A |
| **Maximum inductive load** | circuit 1: 145 mJ / 1.16 H at 24 VDC, 500 mA (comparable with DC13 according to EN 60947-5-1)<br>circuit 2: 145 mJ / 1.16 H at 24 VDC, 500 mA (comparable with DC13 according to EN 60947-5-1) |
| **Short circuit and overload protection** | circuit 1: yes (integrated in the output-FET)<br>circuit 2: yes (through protective circuit) |
| **Reverse voltage protection** | circuit 1: yes<br>circuit 2: yes |
| **Actuation forces** | from switch 1 to 2: typically 5N<br>from switch 2 to 3: typically 10 N |

*Fig.4-4: Technical data of the enabling device*

## 4.5 Connection Module VAC 30.2

| | |
|---|---|
| **Connections** | • 1 x ethernet connection (RJ 45, 10/100 Base-T)<br>• STOP push button<br>• Enabling device<br>• Power supply 24 V (see IndraControl VCH 08.1) |
| **Prescribed external fusing** | 2 A time lag safety fuse |
| **Material** | front panel: aluminum, metal cover: V2A |
| **Degree of protection** | front panel IP 65, rear side IP 30 |

*Fig.4-5: Technical data of the IndraControl VAC 30.2*

*1) Please fuse cables against short circuits and cross circuits caused by the installation!*

# 4.6 Ambient Conditions

| | In operation | Storage | Transportation |
|---|---|---|---|
| **Max. ambient temperature** | +0 °C to 50 °C | -20 °C to +70 °C | |
| **Relative humidity** | 5% to 95% | | |
| **Air pressure** | up to 2,000 m above sea level according to EN 61131-2 | up to 3,000 m above sea level according to EN 61131-2 | up to 3,000 m above sea level according to EN 61131-2 |
| **Free fall** | free fall from 1.5 m height in active status, hazardous impact | free fall from 1.5 m height in active status, hazardous impact | free fall from 1.5 m height in active status, hazardous impact |
| **Mechanical strength** | max. vibration:<br>5 Hz ≤ f < 9 Hz with 7 mm<br>5 Hz ≤ f < 150 Hz with 2 g | max. shock:<br>25 g/11 ms (IEC 60068-2-27) | max. shock:<br>25 g/11 ms (IEC 60068-2-27) |

*Fig.4-6: Ambient conditions of the IndraControl VAC 08.1*

# 4.7 Accessories

| | |
|---|---|
| **Wall bracket** | for stationary operation or for storage |
| VAS 01.1 | wall bracket with cable bracket |
| **Connection cable** | resistant against distorsion, bending and treading, with assembled 17 pole circular connector |
| VAS 05.1 | 8 m |
| VAS 05.2 | 16 m |

*Fig.4-7: Accessories for the VCH 08.1*

# 4.8 Identification

Users identify the device using the name plate on the rear side of the device.

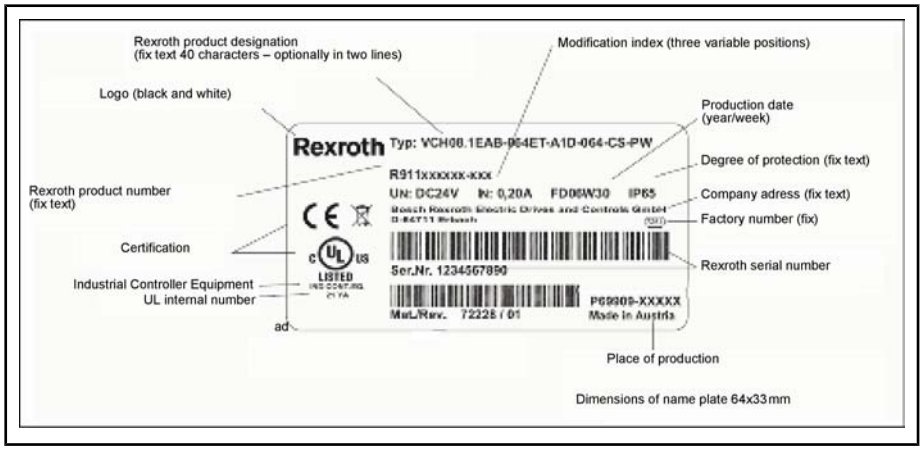



*Fig.4-8: Name plate of the IndraControl VAC 08.1*

# 4.9 Weight

| | |
|---|---|
| **IndraControl VCH 08.1** | approx. 1.2 kg without cable |

*Fig.4-9: Weight of the IndraControl VAC 08.1*

# 4.10 Applied Standards

The system components of the hand-held terminal IndraControl VCH 08.1 correspond with the following standards:

| Standard | Meaning |
|---|---|
| EN 418:1992 | machine safety, EMERGENCY STOP device, functional aspects, design principles |
| EN 954-1:1996 | machine safety - safety-related control system components<br>– part 1: general design principles |
| EN 60204-1:1997, chapter 9, chapter 10 | machine safety - eletrical configuration of machines<br>– part 1: general requirements |
| EN 61131-2:2003 chapters 8, 9 | programmable logic controllers<br>– part 2: operating equipment requirements and tests |
| EN 61000-6-2:2001 | EMC interference resistance standard for industrial applications |
| EN 61000-6-4:2001 | EMC emitted interference standard for industrial applications |
| EN ISO 12100-1:2003 | machine safety - generic terms, general design principles<br>– part 1: basic terminology, methods |
| EN ISO 12100-2:2003 | machine safety - generic terms, general design principles - part 2: technical principles |
| EN 954-1:1996 | machine safety - safety-related control system components<br>– part 1: general design principles |
| EN 60204-1:1997 | machine safety - eletrical configuration of machines<br>– part 1: general requirements |
| ISO 10218-1:2006 | manipulating industrial robots – safety |
| EN 60204-1:1997 chapters 9, 10 | machine safety - eletrical configuration of machines<br>– part 1: general requirements |
| EN 614-1:1995 | machine safety - principles of ergonomic design<br>– part 1: terms and general principles |
| EN 894-1:1997 | machine safety - ergonomic requirements concerning the design of displays and control elements<br>– part 1: general principles for user interactions with displays and control elements |
| EN 894-2:1997 | machine safety - ergonomic requirements concerning the design of displays and control elements<br>– part 2: displays |
| EN 894-3:1997 | machine safety - ergonomic requirements concerning the design of displays and control elements<br>– part 3: control elements |
| EN 60529:1991 | degrees of protection through casings |
| EN 61131-2:2003 chapter 12 | programmable logic controllers<br>– part 2: requirements and tests |
| EN 61131-2:2003 chapter 11 | programmable logic controllers<br>– part 2: requirements and tests |
| EN 50178 | configuration of power installations with electronic operating equipment |

| Standard | Meaning |
|---|---|
| EN 61131-2:2003 chapter 4 | programmable logic controllers<br>– part 2: requirements and tests |
| EN 50178 | configuration of power installations with electronic operating equipment |
| EN 50173-1:2002 | information technology - application independent communication cable systems |
| ISO/IEC 11801:2002 | information technology – generic cabling for customers premises |

*Fig.4-10: Applied standards*

☞ All CE requirements are fulfilled concerning supplied IndraControl VCH 08.1.

**UL/CSA Certification**

The hand-held terminal IndraControl VCH 08.1 device is certified according to

- **UL508** (Industrial Control Equipment) and
- **C22.2 no. 142-M1987** (CSA)

It is possible, however, that there are combinations or extension stages for which the certification is either restricted or missing. For this reason please verify the registration by referring to the UL marking on the device.

☞ To guarantee UL/CSA-compliant operation, the following conditions must be fulfilled:

- Only use 140/167 F insulated copper wire.
- All connections must be protected by a 2 A time-lag safety fuse.

☞ The UL/CSA marking is only valid for the device as in its delivery status. The UL compliancy must be verified subsequent to modifications to the device.

## 4.11 Compatibility Test

All Rexroth controls and drives are developed and tested according to the latest state-of-the-art of technology.

As it is impossible to follow the continuing development of all materials (e. g. lubricants in machine tools) which may interact with our controls and drives, it cannot be completely ruled out that any reactions with the materials used by Bosch Rexroth might occur.

For this reason, before using the respective material a compatibility test has to be carried out for new lubricants, cleaning agents etc. and our housings / our housing materials.

# 5 Dimensions

## 5.1 Casing Dimensions of the IndraControl VCH 08.1

The IndraControl VCH 08.1 is 252 mm wide and 240 mm high.

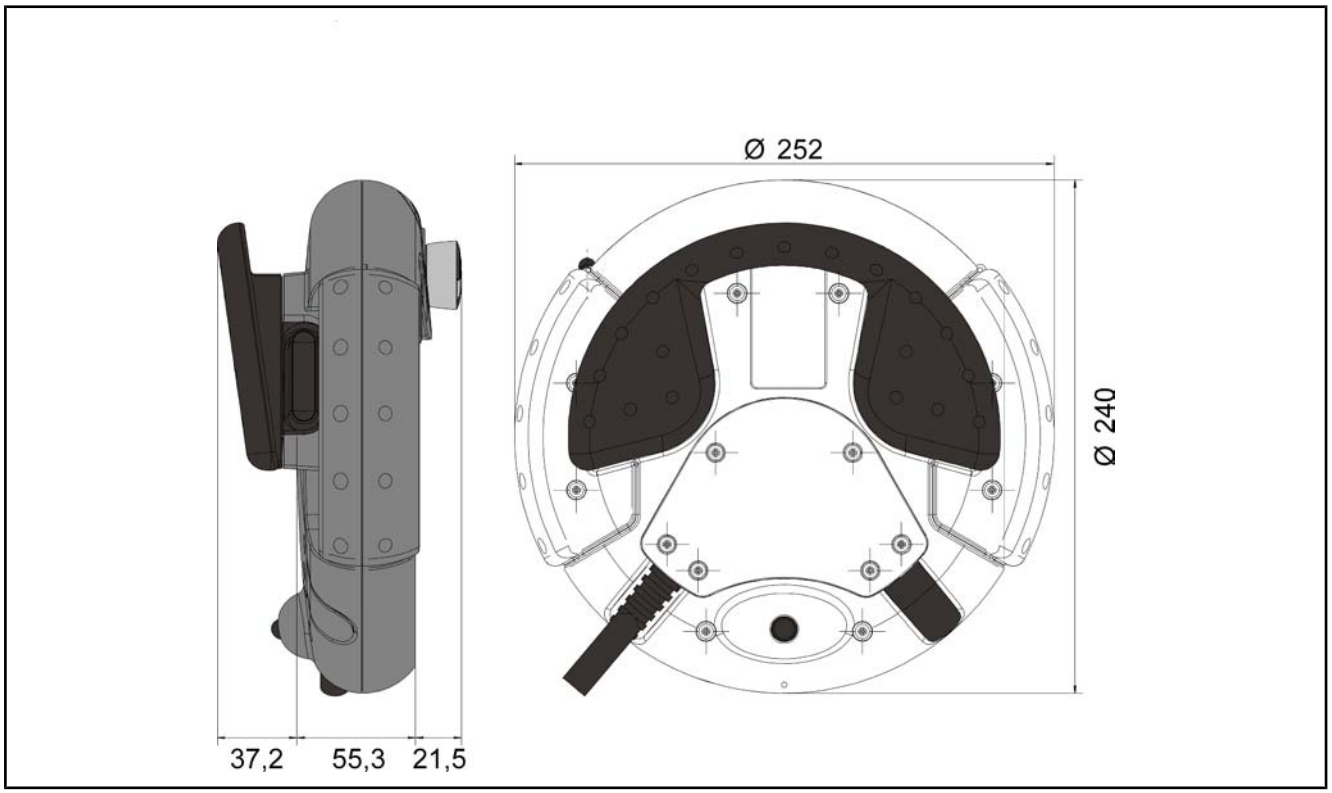



*Fig.5-1: Dimensions of the IndraControl VAC 08.1*

# 5.2 Casing and Mounting Dimensions of the IndraControl VAC 30.2

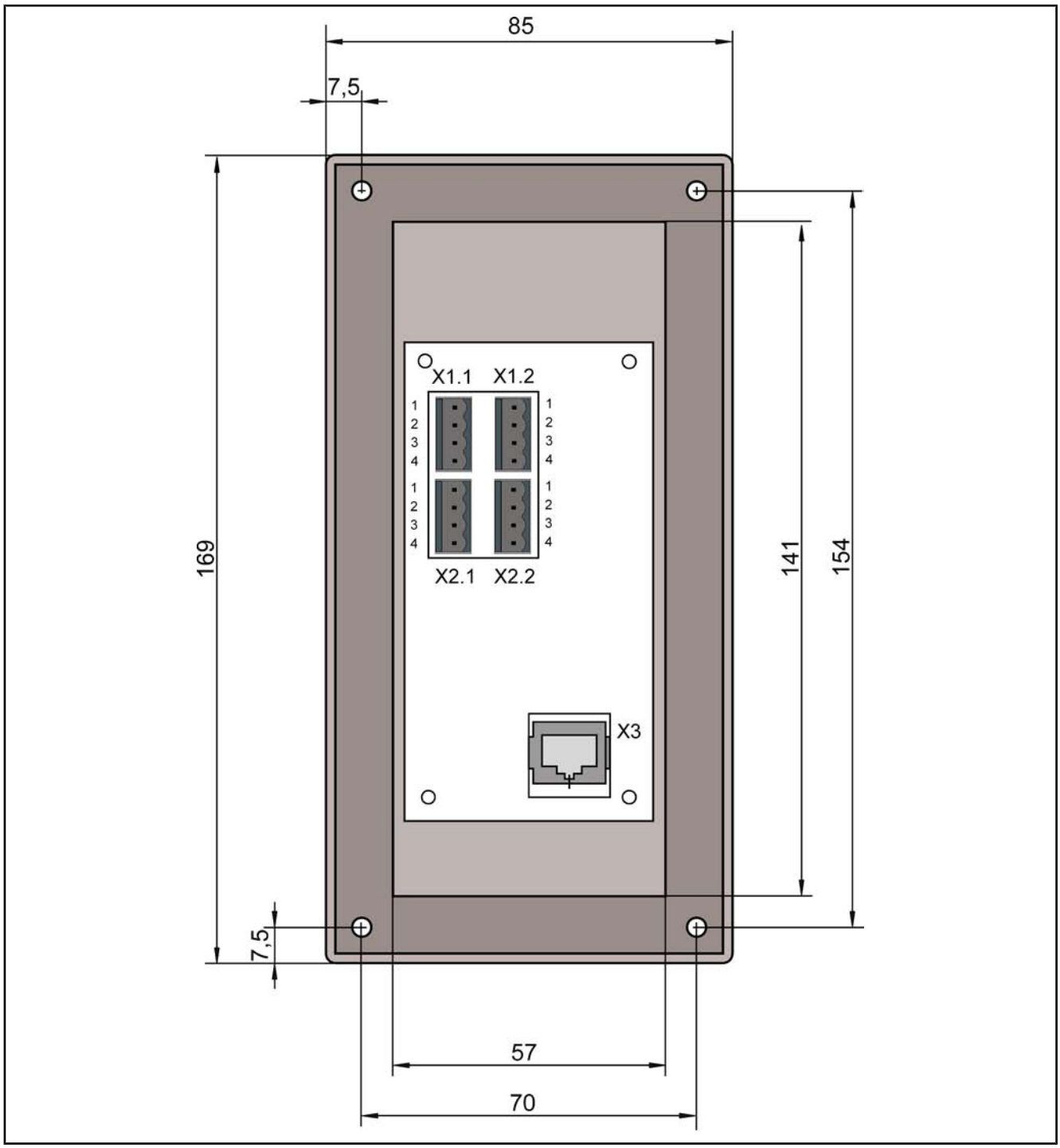



*Fig.5-2: Casing and mounting dimensions of the IndraControl VAC 30.2*

# 5.3 Dimensions of the Wall Bracket VAS 01.1

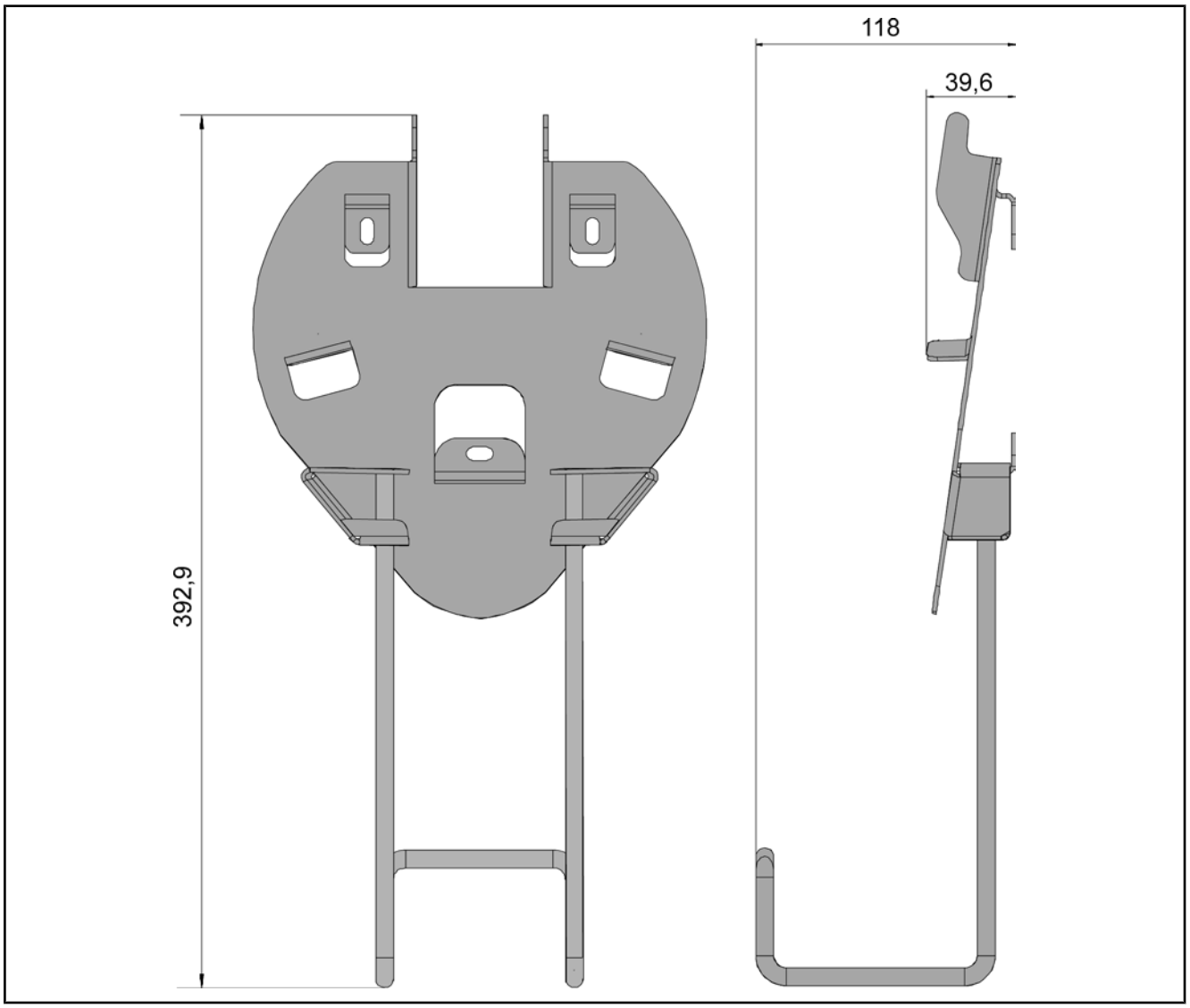



*Fig.5-3: Rear and side view of the VAS 01.1*

# 6 Display and Operating Components

## 6.1 Operating Elements

### 6.1.1 Overview

Information from almost all of the operating elements is transmitted to the controller in the form of a real time protocol and is available there via a function block. For further information, please see the chapter 9.3 "Evaluating the Commands of the Operating Elements" on page 63.

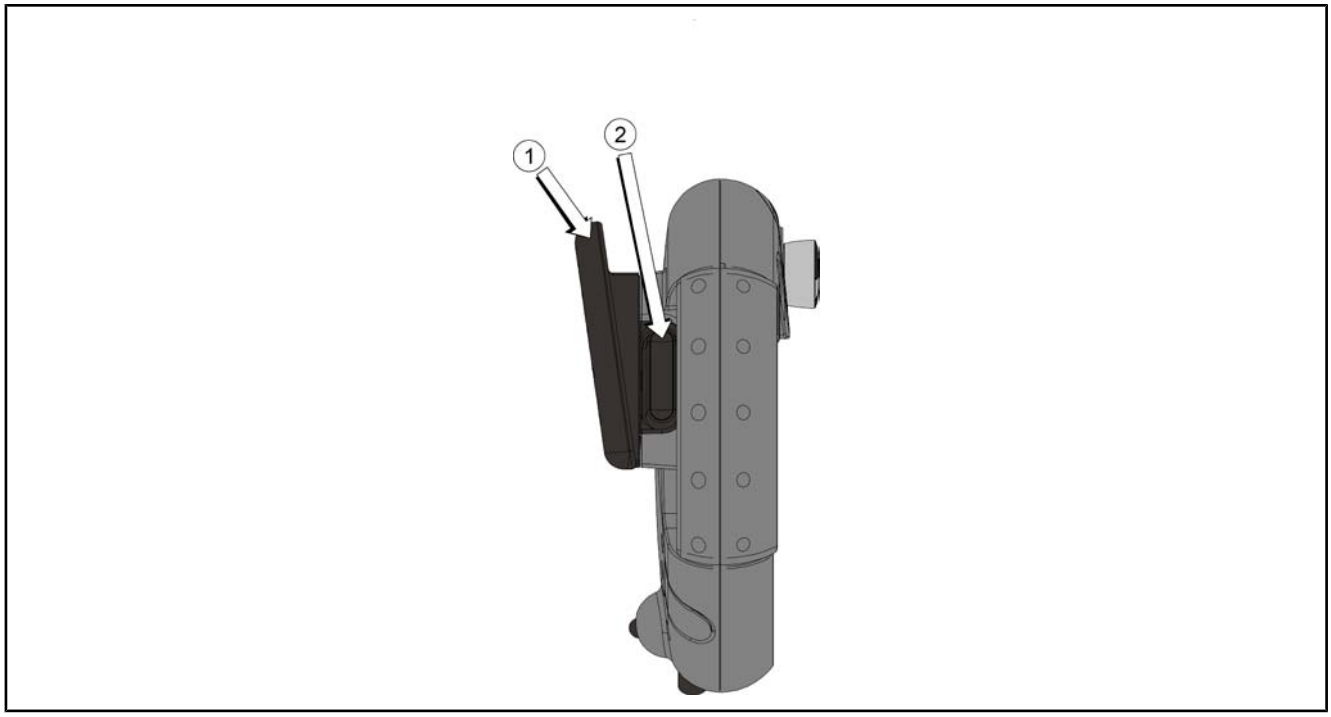
### 6.1.2 Casing of the IndraControl VAC 08.1

#### Overview

An enabling switch with two actuators for the enabling switch is integrated in the IndraControl VCH 08.1 which when appropriately wired and evaluated an be used in safety circuits up to category 4 (EN 954-1).

*Fig.6-1: Front view of the IndraControl VAC 08.1*

Display and Operating Components




① Functional multi-grip handle
② Two dual circuit, 3 stage enabling switches (one on the left, one on the right),

*Fig.6-2: Side view of the IndraControl VAC 08.1*

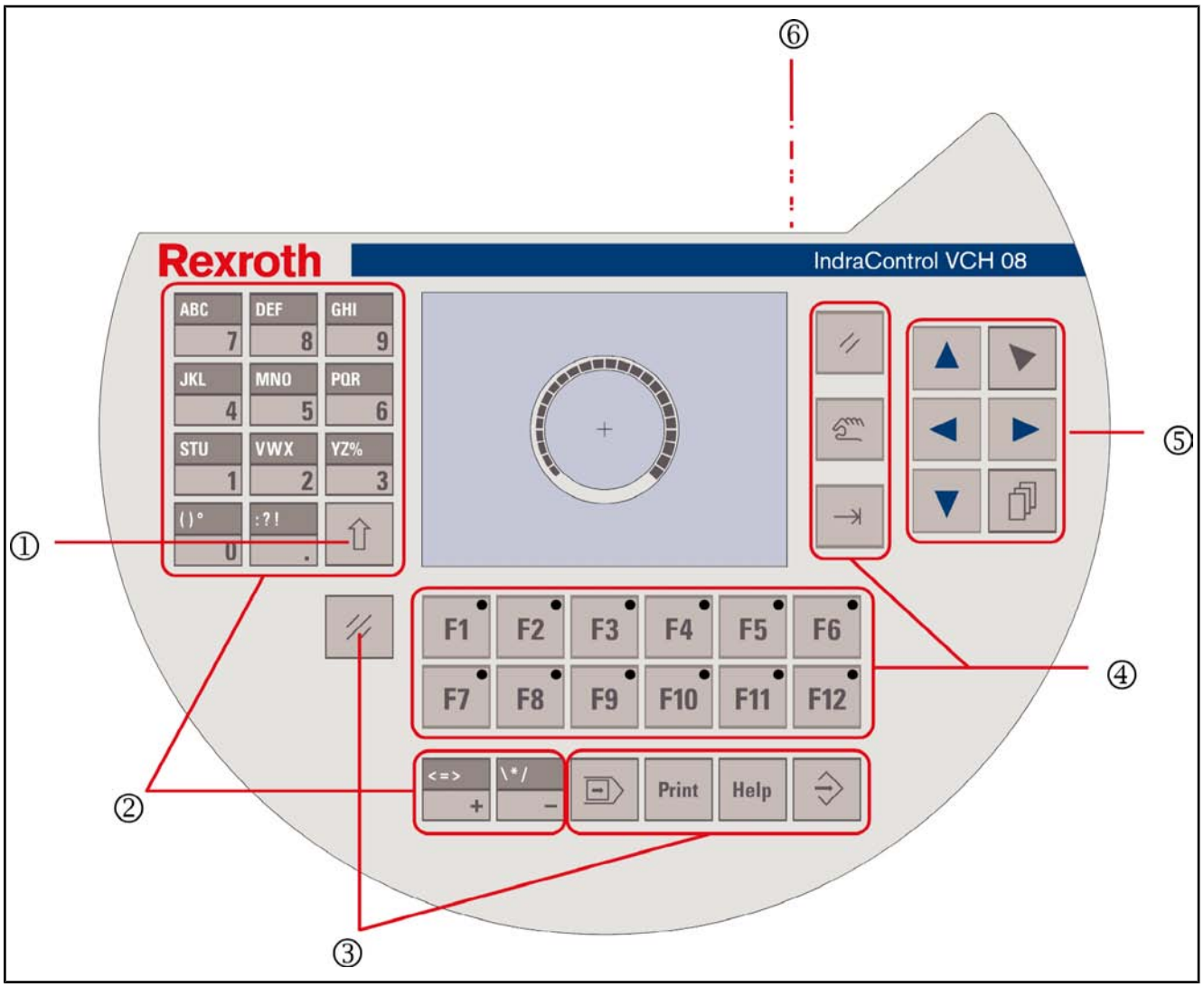
The enabling switch and the two actuators for the enabling switch are integrated in the bottom part of the casing.

## Ergonomics

- Functional multi-grip handle
- Round casing
- Different handle positions
- Operation suitable for left and right handed persons
- Operation on a table
- Operation in wall bracket
- Optional cable guidance left or right of the housing through simple rerouting
- clearly legible display

## 6.1.3 Keypad

### Position of the Keys on the IndraControl VCH 08.1




| | |
|---|---|
| ① | Shift key |
| ② | Editing keys |
| ③ | Special keys |
| ④ | Function keys |
| ⑤ | Navigation keys |
| ⑥ (at the rear) | Enabling switch |

*Fig.6-3: Positions of the keys on the IndraControl VCH 08.1*

## 6.1.4 Safety Operating Elements

### Safety Concept

The hand-held terminal IndraControl VCH 08.1 contains a dual circuit, 3-stage enabling switch which is operated by two integrated actuators located on the rear side of the housing. The enabling switch consists of individual switching elements and can be used in safety circuits up to category 4 (EN 954-1) if the evaluation is appropriate. For this, the two circuits have been ndirect coupled and designed in a redundant manner.

In operating modes with enabling switches one of the actuators of the hand-held terminal IndraControl VCH 08.1 must be consciously held in the central

switch position. Releasing or firmly pushing through the actuator leads to the stopping of dangerous movements. When moving back from the pushed position to the inactivated position, no enabling signal is emitted.

As an additional safety operating element, the hand-held terminal IndraControl VCH 08.1 includes a STOP push button which is also designed as a dual circuit element. The switch contacts are directly guided outwards above the connecting cables and can be connected via the IndraControl VAC 30.2. It is possible to interrupt the operation of the system in all operating modes using the STOP push button (STOP category 0).

## Enabling Function

The IndraControl VCH 08.1 includes two enabling switches which are located on both sides of the device. This means that operation using either the left or the right hand is possible. The two enabling switches are parallel connected and have an equal effect on the shared safety circuits in the connection cable. Only one of the two switches must be actuated.

The enabling switch consists of a 3-stage operating element and separate evaluation electronics. One essential feature is the consistent dual circuit design, beginning at the actuation elements and continuing to the connection clips. The evaluation circuits have been realized with different technologies and circuits. Subject to observance of the nominal values (ohmic, inductive and capacitive), the electronic switching contacts are wear-free.

The switching elements of the enabling switch are designed with reverse-voltage protection. The outputs of the two circuits are protected against short circuiting and overloading:

circuit 1: thermally protective circuit

circuit 2: fold back characteristic

**Operating Principle**

The actuation element consists of two symmetrically arranged rocker switches, the position of which can be detected and transmitted to the evaluation electronics using electric buttons.

The enabling switch can assume three different switch positions:

| Switch position | Function | Enabling switch | Switching contact |
|---|---|---|---|
| 1 | zero position | is not confirmed | off (open) |
| 2 | enabling | is confirmed | on (closed) |
| 3 | panic | is extruded | off (open) |

*Fig.6-4: Switching positions of the enabling switch*

**Normal Actuation**

Zero position ⇒ x ⇒ enabling ⇒ y ⇒ zero position

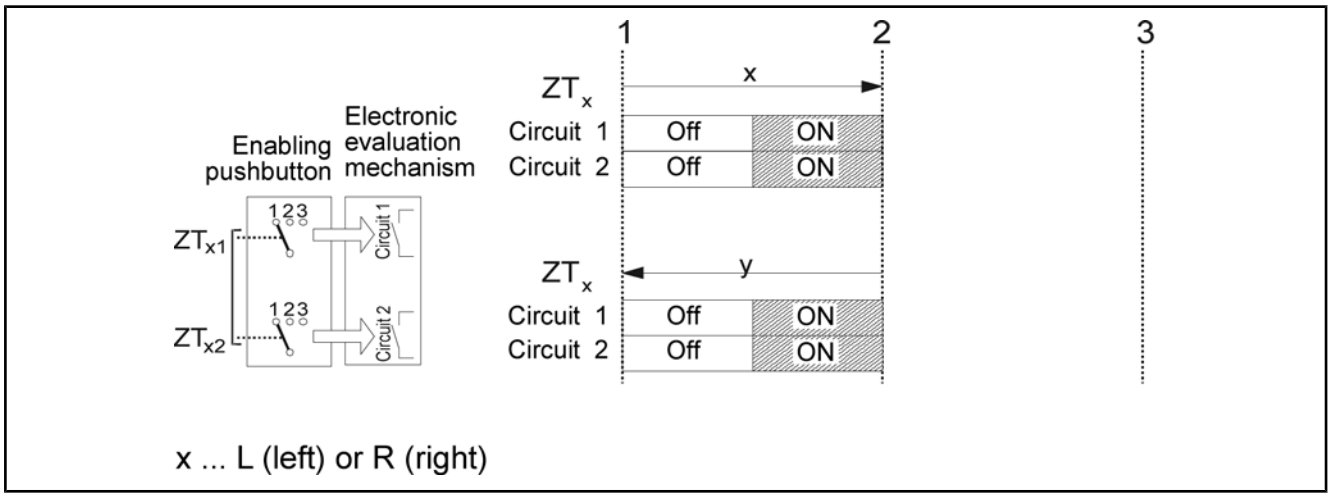



*Fig.6-5: Switch path diagram for normal actuation*

**Panic Actuation** Zero position ⇒ x ⇒ enabling ⇒ u ⇒ panic ⇒ v ⇒ zero position

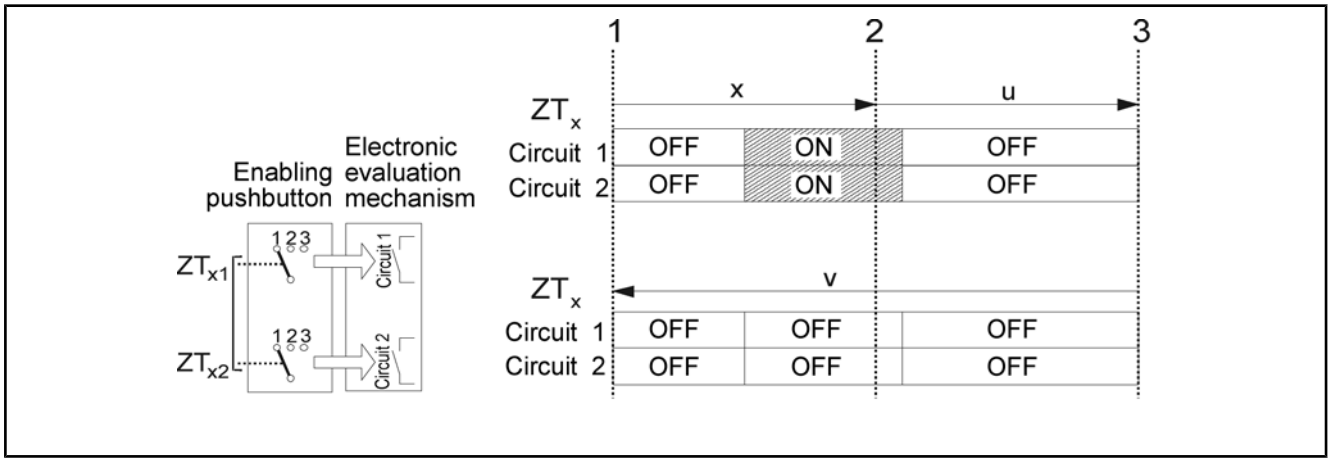



*Fig.6-6: Switch path diagram for panic actuation*

☞ The enabling switches with the IndraControl VCH 08.1 are designed as dual circuit switches.

Attaining safety category 3 according to EN 954-1:1996 can be achieved through realizing the enabling device with 2 circuits.

Safety category 3 means that a failure does not have to lead to loss of safety and that an individual failure is detected whenever this can be appropriately realized.

## Predictable Misuse of the Enabling Switch

Impermissible fixing of the enabling switch in the enabling position by using auxiliary means is considered as foreseeable misuse. Such foreseeable misuse is to be prevented. The following measures which result in the standstill of the machine during manual operation are recommended:

- A request of the enabling switch when switching on the machine or the system and a request of the enabling switch when changing the mode of operation from automatic to manual (manual operation). (The enabling switch must not be in the "enabling" position.)
- The enabling switch must be released within a determined period and must be reset to the "enabling" position. The length of the period must be chosen in accordance with the operation requirements.

WARNING

**The enabling switch is only suitable as a protective function if the person actuating the enabling switch identifies potential hazards to people in time and immediately takes measures to prevent such hazards!**

A reduced velocity of travel may be required as additional measure. The permitted velocity must be determined on the basis of a risk evaluation.

No commands that result in hazardous states may be triggered using only a single enabling switch. A second starting command is required for this (key on manual operating device).

Only the person actuating the enabling switch may remain in the area of risk.

## STOP Push Button

The IndraControl VAC 30.2 is equipped with an automatic STOP circuit jumper. This allows the operator to connect or disconnect the hand-held terminal IndraControl VCH 08.1 via the IndraControl VAC 30.1 connection module without causing the unintended stopping of the system.

Before starting up the IndraControl VCH 08.1 it must be ensured that the STOP push button is **not** depressed. The connection of a IndraControl VCH 08.1 with a depressed STOP push button would shut down the system.

## Functionality of the STOP Circuit Jumper

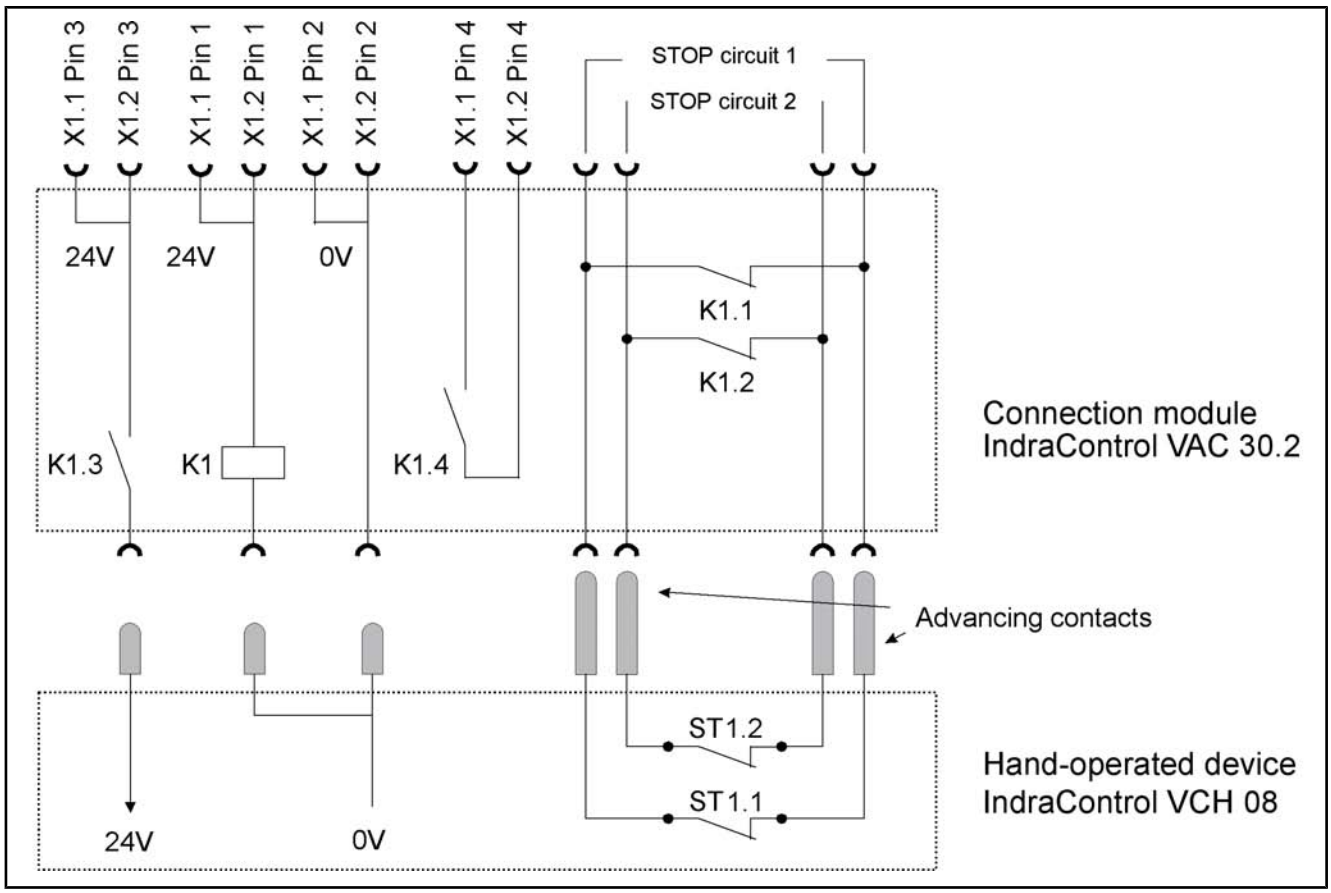



*Fig.6-7: STOP circuit jumper*

If the hand-held terminal IndraControl VCH 08.1 is not plugged in, the contacts K1.1 and K1.2 of relay K1 in the IndraControl VAC 30.1 connection module

keep STOP circuits 1 and 2 of the controller closed. The STOP circuits are active and the controller is ready for operation.

If the 17-pin connector of the IndraControl VCH 08.1 is screwed onto the IndraControl VAC 30.2 connection module, advanced contacts switch the open contacts ST1.1 and ST1.2 into the STOP circuits. The IndraControl VCH 08.1 remains without power supply and the STOP push button has no effect.

If the 17-pin connector is completely screwed onto the connection module, relay K1 switches and supplies the IndraControl VCH 08.1with power via NO contact K1.3. Through opening contacts K1.1 and K1.2 the STOP circuit jumping is simultaneously deactivated. The STOP circuits are active, the controller is ready for operation and the STOP push button is integrated into the STOP circuits.

The VAC 30.2 connection module must be permanently supplied with power (24 V) via pin 1 X1.1 or pin 1 X1.2. In order to ensure a 100% safe integration of the STOP push button, you must provide power monitoring at this point. The connected manual operating device can be supplied with 24 V by means of pin 3 X1.1 or pin 3 X1.2 and can thus be arbitrarily switched on and off.

The time sequence of the connection procedure is illustrated in fig. 6-8 "Time sequence when connecting the IndraControl VEH 08.1 STOP circuit" on page 33.

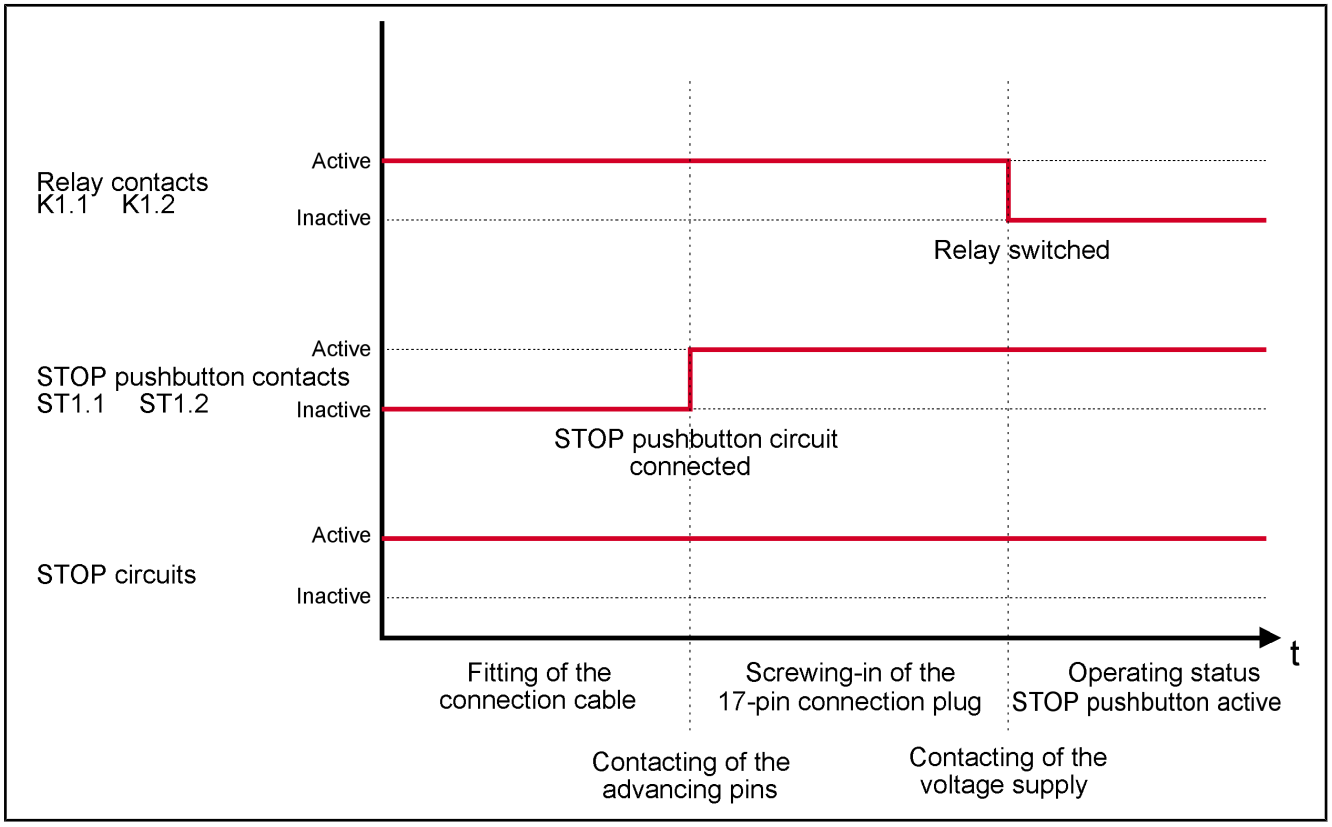



*Fig.6-8: Time sequence when connecting the IndraControl VEH 08.1 STOP circuit*

## 6.1.5 Optional Operating Elements

### Additional Components

The following additional components to operate the controls and systems are available:

- Override potentiometer

- Electronic hand wheel

### Override Potentiometer

If the IndraControl VCH 08.1 is equipped with an override potentiometer, this is evaluated in the device via software and transmitted to the control as a 4 bit Gray code via the real time protocol.

The override potentiometer is suitable for a variety of applications, for example, in determining the spindle speed and feed at machine tools.

The application takes over the display of the set value.

- Resolution: Gray code

Also see chapter 9.3 "Evaluating the Commands of the Operating Elements" on page 63.

### Elektronic Hand Wheel

If the IndraControl VCH 08.1 is equipped with an electronic hand wheel, the hand wheel pulses are evaluated in the processor and transmitted to the controller via the real time protocol as a 16 bit value transfer.

50 pulses are counted per revolution. Turning the hand wheel clockwise increases the counter value, turning it anti-clockwise decreases the counter value (0 to 65535, 16 bit value).

The application takes over the display of the set value. The resetting of the set values occurs via an operating element on the applicable application.

- 50 detents per revolution
- 1 pulse per detent

Also refer to chapter 9.3 "Evaluating the Commands of the Operating Elements" on page 63.

☞ In the event that the hand-held terminal IndraControl VCH 08.1 should fall on the floor, check the mechanical position of the turning knob. The turning knob may be re-locked into position by applying central pressure to it.

## 6.2 Display

### 6.2.1 Overview

WARNING

**Danger of poisoning**

If the display is damaged, avoid direct skin contact with or swallowing or inhaling any of the leaking liquids or gases!

WARNING

**Danger of burning**

If the display is damaged, avoid direct skin contact with or swallowing or inhaling any of the leaking liquids or gases!

### 6.2.2 Contrast Setting

To set the contrast you must set the "LcdContrast" system variable in a random screen in the project planning software.

☞ To do this, follow the instructions in the project planning software manual as stated under point "How to design the contrast settings for the operating device".

Enter the following values for the lower and upper limits for the presentation type in the project planning software:

| System variable | Lower limit | Upper limit | Basic setting |
|---|---|---|---|
| LcdContrast | +1 | +31 | +15 |

*Fig.6-9: Values for the type of display*

☞ If you to not project the "LcdContrast" system variable, the initial setting will be applied during the initialization of the device.

If the system variable has been installed, you can set the contrast as follows: as a prerequisite, you must already be in the screen in which you installed the system variable.

1. Press the "enable data" key if the data enabling function is not automatically activated.
2. Enter a new value for the contrast. To do this, use either keys 0 to 9 or the plus and minus keys.
3. Press the "Apply data " key.
4. Press the "enable data" key.

   The contrast changes directly after pressing the "Apply data" key.

You may need to repeat steps 2 and 3 until the contrast meets with your requirements.

# 6.3 Character Attributes

You can display the following character attributes with the operating device:

- Flashing
- Underline
- Foreground and background color

# 6.4 Character Sets

You have the option of using Windows fonts. Both Windows and Unicode character sets are available.

# 6.5 Keypad

## 6.5.1 Overview

The key elements are located beneath an embossed polyester membrane which is resistant to environmental influences. The assignement of keypad functions can be set in the project planning software.

## 6.5.2 Editing Keys

In order to activate the editing mode you must first press the special key "Enable data".

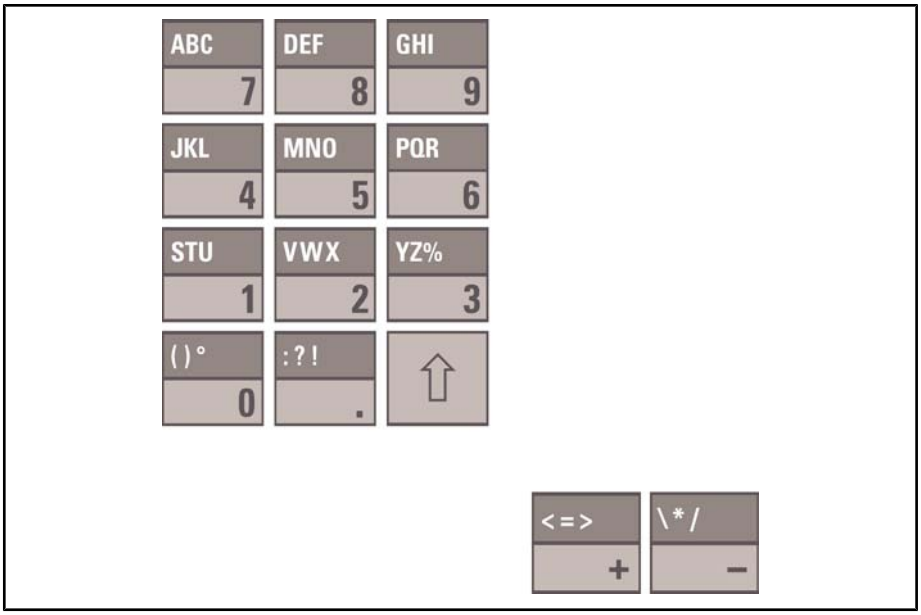



*Fig.6-10: Editing keys of the VCH 08.1*

When projecting the system variables "Shift" or "ShiftCase" entering the characters "A" to "Z" as well as punctuation marks and special characters is possible.

## 6.5.3 Function Keys

The functions of the function keys can be freely assigned (with soft-key functionality). You can optionally use the function keys as direct keys for menu navigation or for triggering a function in the controller.

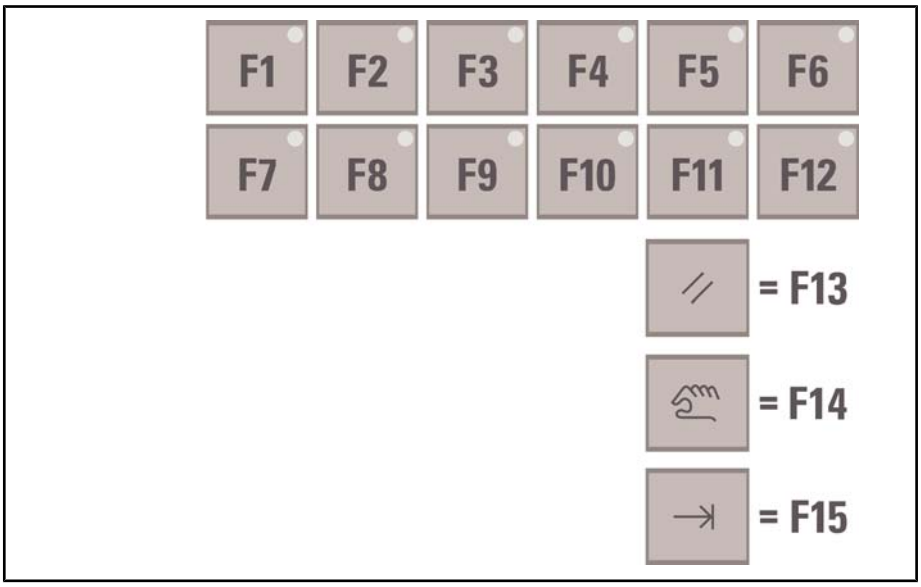



*Fig.6-11: Function keys of the VCH 08.1*

## 6.5.4 Shift Key

The shift key should be dealt with the same way as a function key and can be freely assigned. It should be assigned with the function "Shift" or "ShiftCase", however.

*Fig.6-12: Shift key of the VCH 08.1*

## 6.5.5 Navigation Keys

The navigation keys can be projected for the direct selection of any screens; this does not apply to the "scroll" key, however. In Editor, the navigation keys move the cursor according to the direction of the arrow.

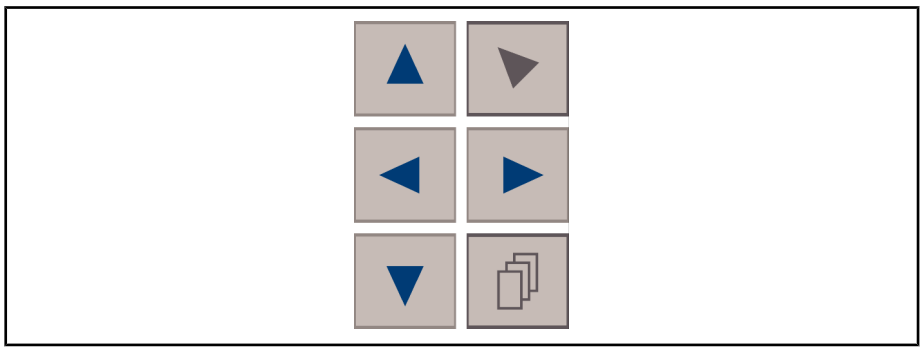
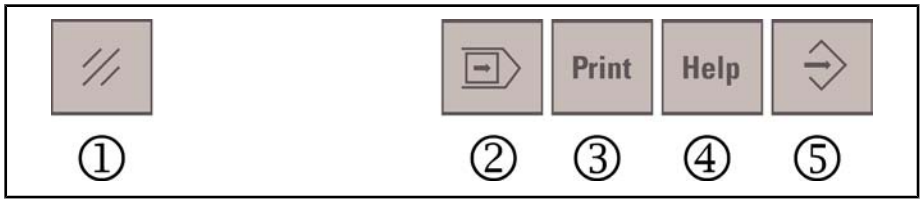


*Fig.6-13: Navigation keys of the VCH 08.1*

## 6.5.6 Special Keys

The IndraControl VCH 08.1 has the following special keys:




① Delete
② Enable data
③ Print
④ Help
⑤ Apply data

*Fig.6-14: Special keys of the VCH 08.1*

**Delete** In the editor the "Delete" key deletes the character beneath the cursor. It also removes the selected messages from the data memory

**Enable data** The "Enable data" key switches from the menu to the editor. By pressing the key again in the editing mode, the device switches back to the menu.

**Print** The "Print" key can be projected for the activation of various printing processes.

**Help** The "Help" key always displays the applicable help text (online help). The system messages are always displayed in full text.

**Apply data** The "Apply data" (Enter) key serves the completion of the data input. During the start-up dialog, the setup dialog is selected by pressing the "Apply data" key.

# 7 Pin Assignments of the IndraControl VCH 08.1

## 7.1 Laying the Cables in the Cable Chamber

### 7.1.1 Image of the Cable Chamber

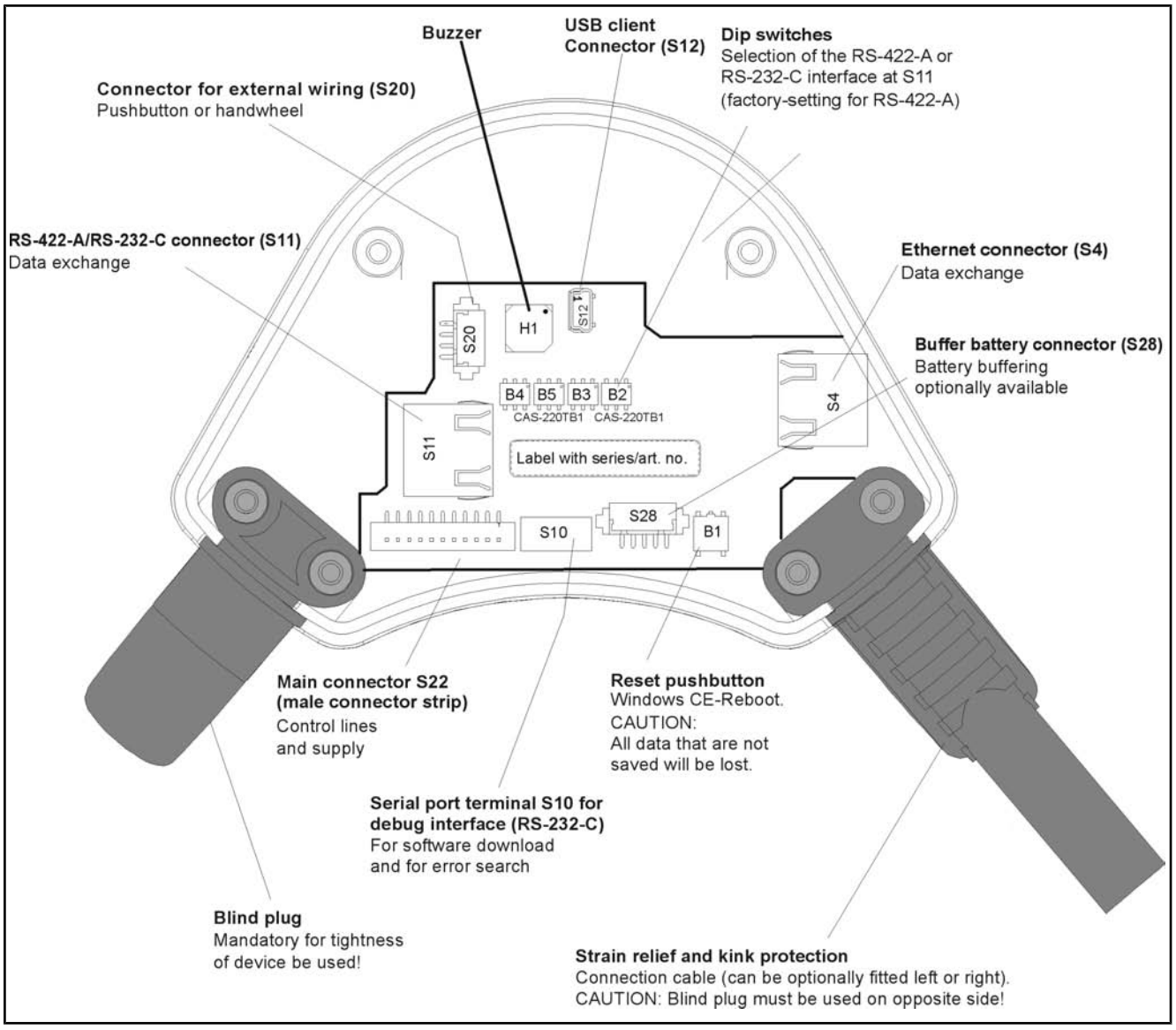



*Fig.7-1: Cable chamber of the VCH 08.1*

### 7.1.2 Laying the Cables

After opening the cable chamber the connection lines can be layed as illustrated in the chapters below.

Before opening the IndraControl VCH 08.1, please observe the following advice:

Pin Assignments of the IndraControl VCH 08.1

**Opening the cable chamber.**

- Place the IndraControl VCH 08.1 on an even and clean surface with the display facing upwards so that the IndraControl VCH 08.1 or its operating elements are not damaged (e.g. ESD mat).
- Use a sized 2 Philips screw driver to topen and close the cable chamber.

**Modifications in the cable chamber:**

- When disconnecting the main connector (S22) please ensure that the connector is disconnected by pulling at its core (do not use any pointed devices).
- When disconnecting the RJ-45 connectors (S11 or S4) please make sure that you press the locking lever.

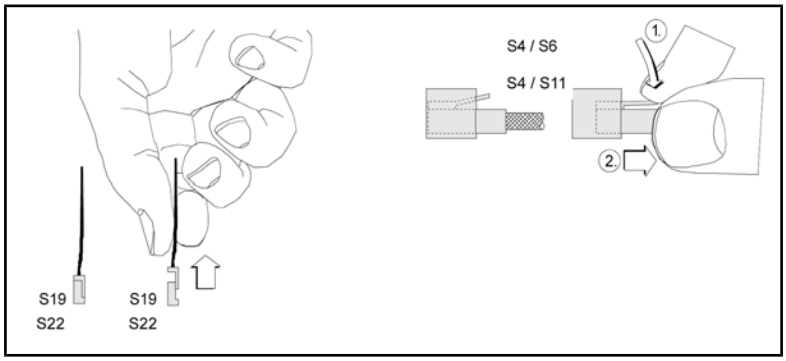



*Fig.7-2:*

In order to prevent functional interference, please ensure that when connecting the S22 and S11/S4 connectors they are correctly locked in place.

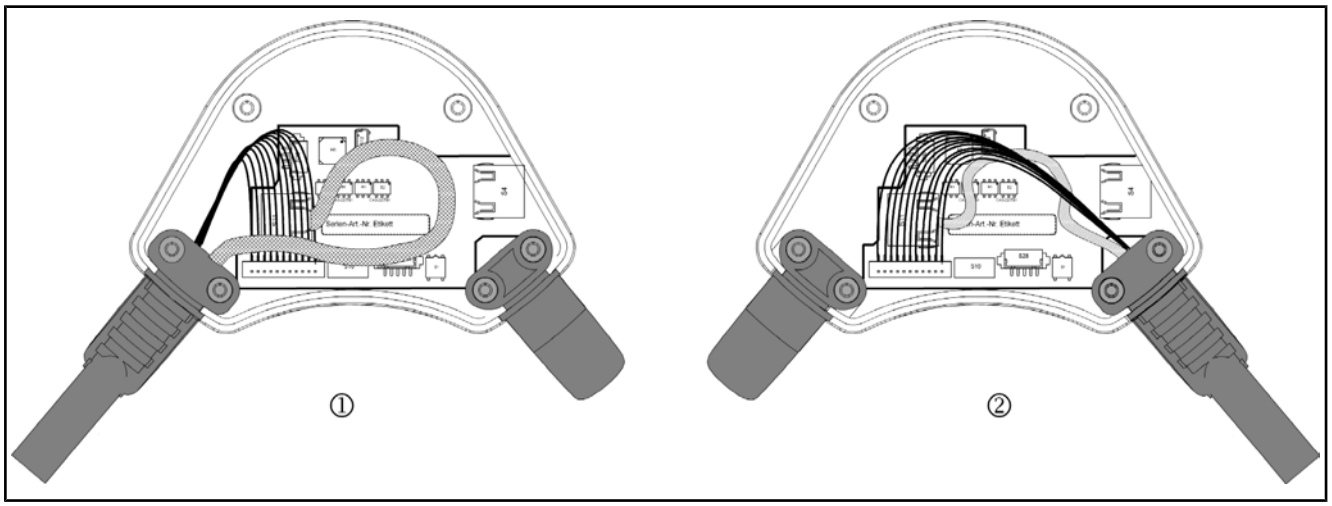
**Advice on closing the cable chamber:**

- The seal must be clean and intact and be situated at the correct position in the cable chamber cover.
- No cables may be clamped.
- The cable chamber cover must be screwed on using all 6 screws (torque: 0.4 to 0.5 Nm). It is only in this way that an adequate degree of protection can be guaranteeed.

**Cable Guidance RS-232-C, Black RJ-45 Connector**

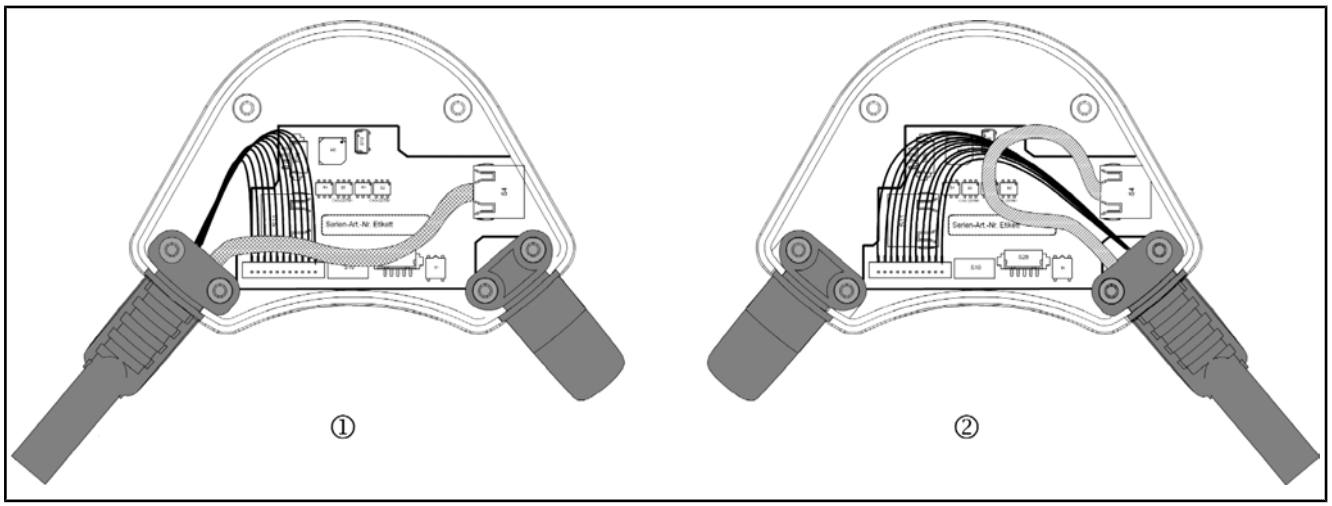
.

.




① Right
② Left
*Fig.7-3: Cable running on the left or the right when using the RS-232-C interface*

**Cable Guidance Ethernet** .




① Right
② Left
*Fig.7-4: Cable running on the left or the right when using the ethernet interface*

## 7.2 STOP Switch

The STOP switch is dual circuit wired and the contacts are realized as opening contacts.

The following applies for the version with the red-yellow EMERGENCY STOP switch: The red-yellow EMERGENCY STOP switch on the IndraControl VCH 08.1 complies with the requirements of EN 418. Its mode of operation must be determined as a stop of category 0 or of category 1 on the basis of the risk evaluation for the machine (see EN 60204-1 chapter 9.2.5.4.2). The wiring of the spring loaded switching contacts must comply with the safety category (according to EN 954-1) that is determined on the basis of the risk analysis (according to EN 1050) of the machine.

In practical terms, the gray STOP switch has the same functionality as the red-yellow EMERGENCY STOP switch. It complies with all of the mechanical aspects of EN 418 and merely differs in color. However, by means of its color-

ing, the gray STOP switch is to prevent the operator from using the EMERGENCY STOP switch when the manual operating terminal is disconnected; in this case the EMERGENCY STOP switch has no effect.

WARNING

**Non-functioning EMERGENCY STOP devices can have disasterous consequences!**

Red-yellow marked EMERGENCY STOP switches must be in working order at all times and for all modes of operation of a machine or a system.

Hand operated devices with a red-yellow EMERGENCY STOP switch that are not connected to a machine must be stored in such a manner that they are not visible and hence cannot be confused with functioning devices in the event of an emergency.

For this reason, hand operated devices that are intended for frequent temporary connection and disconnection to/from machines must not be equipped with a red-yellow EMERGENCY STOP switch. Instead, the gray STOP switch is to be used for such devices.

WARNING

**A release of the EMERGENCY STOP device must not activate an uncontrolled restart.**

WARNING

**The EMERGENCY STOP switch is not intended to dunction as a replacement for safety devices.**

WARNING

**The EMERGENCY STOP switch on the hand-operated device is not intended to function as a replacement for EMERGENCY STOP switches which are to be directly fitted to the machine.**

WARNING

**Specific mechanical faults in the EMERGENCY STOP or the STOP switches can only be detected on actuation.**

**Notes on Maintenance**

The EMERGENCY STOP switch must also be tested cyclically (every 6 months) by actuating the EMERGENCY STOP switch and observing whether or not the machine shuts off.

The manufacturer guarantess a life span of >50,000 switching cycles.

# 7.3 Connection of the IndraControl VCH 08.1 via IndraControl VAC 30.2

## 7.3.1 Overview

The hand-held terminal IndraControl VCH 08.1 is connected via the connection module VAC 30.

A voltage of 24 V must be permanently applied to X1.1 pin 1 or X1.2 pin 1. The hand operated terminal can be started by applying 24 V to X1.1 pin 3 or X1.2 pin 3.

## 7.3.2 Pin Assignment of the IndraControl VAC 30.2

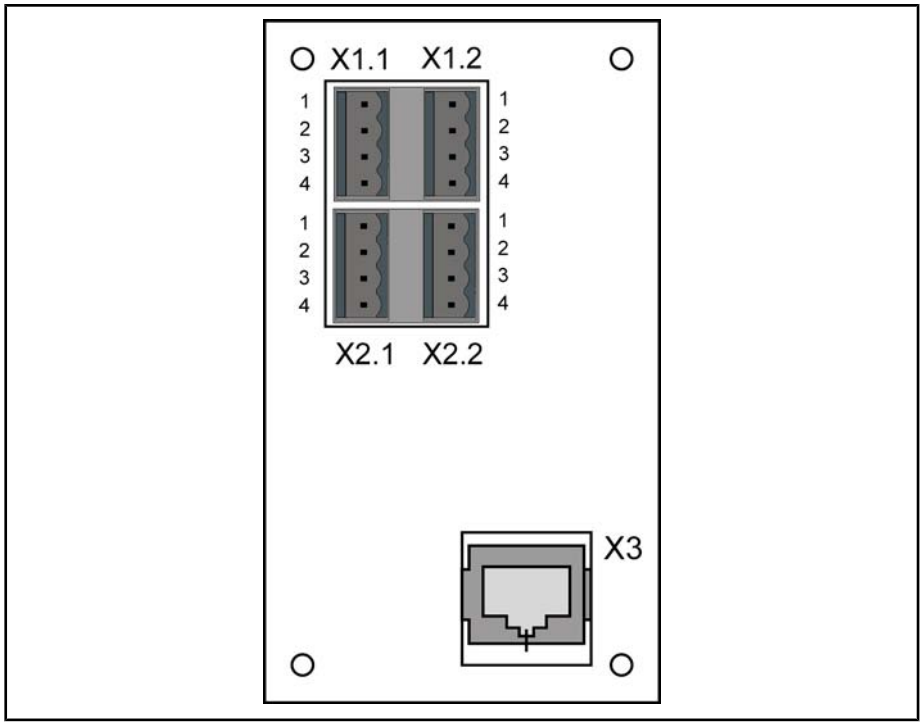



*Fig.7-5: Pin assignment of the IndraControl VAC 30.2 connection module*

| Pin | Signal name |
|---|---|
| X1.1 Pin1 | 24 VDC connection module VAC30 |
| X1.1 Pin2 | 0 V |
| X1.1 Pin3 | 24 VDC hand operated terminal |
| X1.2 Pin1 | 24 VDC connection module VAC30 |
| X1.2 Pin2 | 0 V |
| X1.2 Pin3 | 24 VDC hand operated terminal |
| X1.1 Pin4 | terminal connected IN |
| X1.2 Pin4 | terminal connected OUT |
| X2.1 Pin1 | STOP push button 1 IN |
| X2.1 Pin2 | STOP push button 1 OUT |
| X2.1 Pin3 | STOP push button 2 IN |
| X2.1 Pin4 | STOP push button 2 OUT |
| X2.2 Pin1 | enabling device 1 IN |
| X2.2 Pin2 | enabling device 1 OUT |
| X2.2 Pin3 | enabling device 2 IN |
| X2.2 Pin4 | enabling device 2 OUT |

*Fig.7-6: Pin assignment of the IndraControl VAC 30.2 connection module*

The IndraControl VAC 30.1, which is the version preceding the connection module IndraControl VAC 30.2, is not equipped with a separate voltage supply and an alarm contact. Therefore, the pins 3 and 4 of the X1.1 and X1.2 terminal blocks are not available on the IndraControl VAC 30.1. All pins available on the VAC 30.1 are compatible with the pins of the IndraControl VAC 30.2.

## 7.3.3 X1: 24 VDC Power Supply

All internally required voltages are generated with electrical isolation via a DC/DC converter. The connection is designed as male connector strip S, 3.50 mm pin spacing, so that cables up to a maximum line cross section of 1.5 $mm^2$ can be connected.

| Parameters | Value |
|---|---|
| Rated voltage $U_N$ | 24 VDC; (+19 V to +30 V) |
| Residual ripple with $U_N$ | see fig. 7-9 "Illustration of the limit values for the 24 VDC voltage" on page 45 |
| Noise and surge immunity | $U_{max}$= 35 V (for t < 100 ms) |
| Power consumption with $U_N$ | max. 0.7 A |
| Prescribed external fusing | 2 A time-lag safety fuse |
| Reverse voltage protection | occurs via isolating diode; the line-side fuse is activated when polarity reversal occurs. |

*Fig.7-7: Technical data of the 24 VDC connection*

The external voltage supply must have a rated voltage of 24 V and must not exceed an output voltage of 30 V. The 24 V line to the connection module must be protected by a 2 A time-lag safety fuse.

DANGER

**Danger without protective separation!**

⇒ The 24 VDC input voltage must comply with the requirements of "Protective separation"!

⇒ Plug and unplug the connector only in zero voltage state!

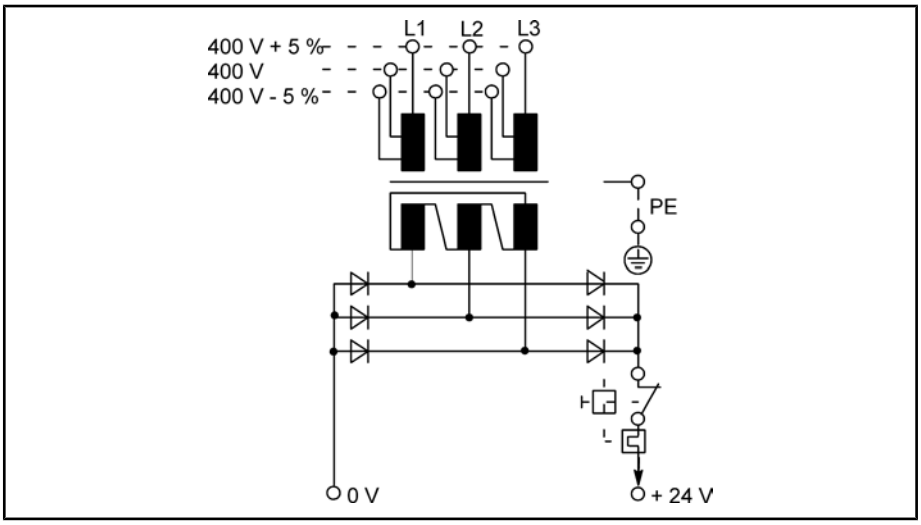



*Fig.7-8: Safety transformer according to EN 60742*

Interfering AC voltage components such as those resulting from an uncontrolled 3-phase current bridge connection without smoothing with a ripple factor (see DIN 40110/10.75, section 1.2) of 5 % are permissible.

It follows from the above that as an upper voltage limit, the greatest absolute value is 30.2 V, and as a lower voltage limit, the lowest absolute value is 18.5 V.

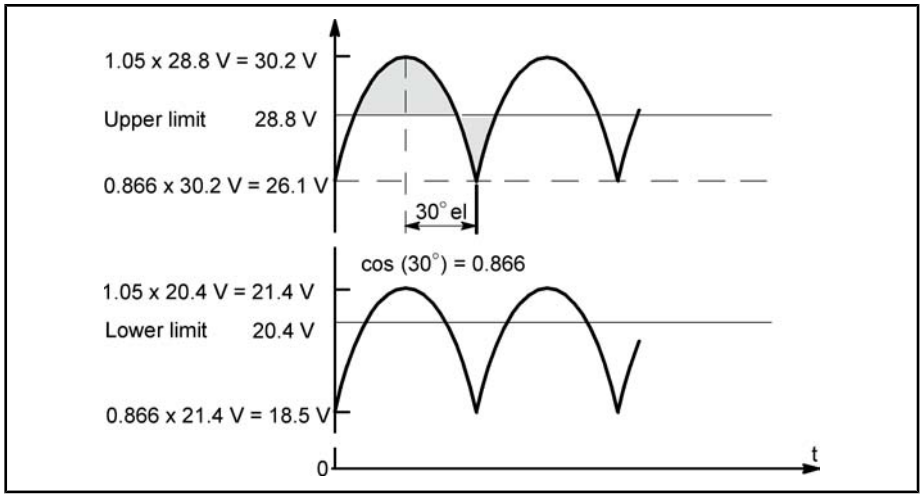



*Fig.7-9: Illustration of the limit values for the 24 VDC voltage*

Pin Assignments of the IndraControl VCH 08.1

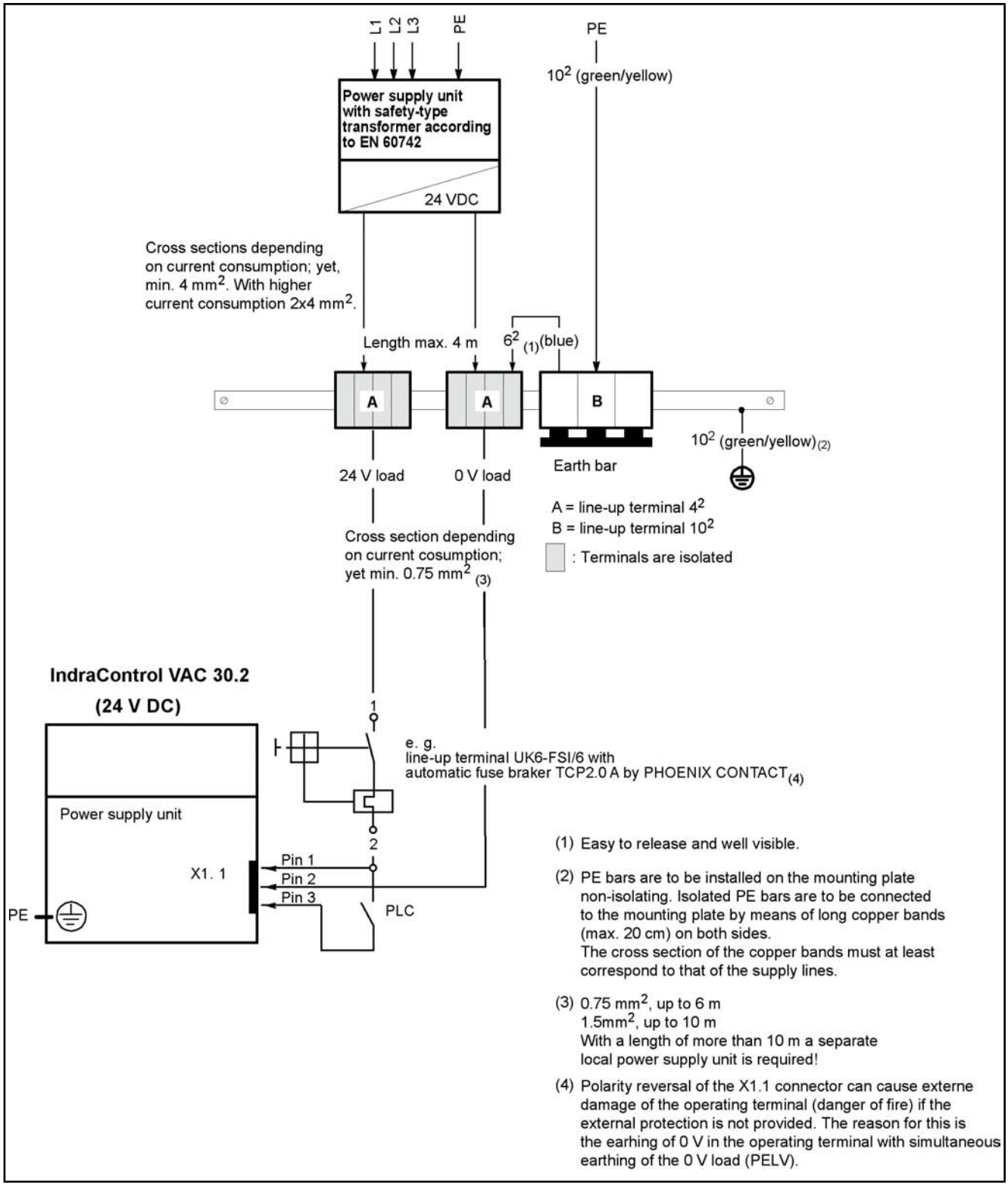

L1
L2
L3
PE
PE
10² (green/yellow)
Power supply unit with safety-type transformer according to EN 60742
24 VDC
Cross sections depending on current consumption; yet, min. 4 mm². With higher current consumption 2x4 mm².
Length max. 4 m
6² (1)(blue)
A
A
B
10² (green/yellow)(2)
Earth bar
24 V load
0 V load
A = line-up terminal 4²
B = line-up terminal 10²
: Terminals are isolated
Cross section depending on current cosumption; yet min. 0.75 mm² (3)
IndraControl VAC 30.2
(24 V DC)
1
2
e. g.
line-up terminal UK6-FSI/6 with
automatic fuse braker TCP2.0 A by PHOENIX CONTACT(4)
Power supply unit
X1. 1
Pin 1
Pin 2
Pin 3
PE
PLC
(1) Easy to release and well visible.
(2) PE bars are to be installed on the mounting plate non-isolating. Isolated PE bars are to be connected to the mounting plate by means of long copper bands (max. 20 cm) on both sides.
The cross section of the copper bands must at least correspond to that of the supply lines.
(3) 0.75 mm², up to 6 m
1.5mm², up to 10 m
With a length of more than 10 m a separate local power supply unit is required!
(4) Polarity reversal of the X1.1 connector can cause externe damage of the operating terminal (danger of fire) if the external protection is not provided. The reason for this is the earhing of 0 V in the operating terminal with simultaneous earthing of the 0 V load (PELV).

*Fig.7-10: Wiring of the 24 VDC power connection and the hand operated device*

## 7.3.4 X2.1: STOP Push Button

### Pin Assignment

| Pin | Signal name |
|---|---|
| X2.1 Pin1 | STOP push button 1 IN |
| X2.1 Pin2 | STOP push button 1 OUT |
| X2.1 Pin3 | STOP push button 2 IN |
| X2.1 Pin4 | STOP push button 2 OUT |

*Fig.7-11: Pin assignment of the STOP push button X2.1*

The circuit of the STOP push button may be operated with a maximum of 30 V and must be protected with a 2 A safety fuse.

## 7.3.5 X2.2: Enabling Device

### Pin Assignment

| Pin | Signal name |
|---|---|
| X2.2 Pin1 | enabling device 1 IN |
| X2.2 Pin2 | enabling device 1 OUT |
| X2.2 Pin3 | enabling device 2 IN |
| X2.2 Pin4 | enabling device 2 OUT |

*Fig.7-12: Enabling device X2.2*

The circuit of the enabling device may only be operated with a maximum of 30 V and must be protected with a 2 A safety fuse.

### Examples for the Connection of the Enabling Switch

#### Overview

The connection examples in chapter "Connection Example with PILZ PST1 Monitoring Device" on page 48 and chapter " Connection Example with ELAN SRB-NA-R-C.27/S1 Monitoring Device" on page 50 illustrate how to reach safety category 3 with the hand-held terminal IndraControl VCH 08.1 and its safety-related components. Please consider that the entire concept of the machine must be appropriately constructed for this.

Monitoring the simultaneity by means of the monitoring device is required, otherwise an accumulation of undetected failures could occur which could result in a loss of safety.

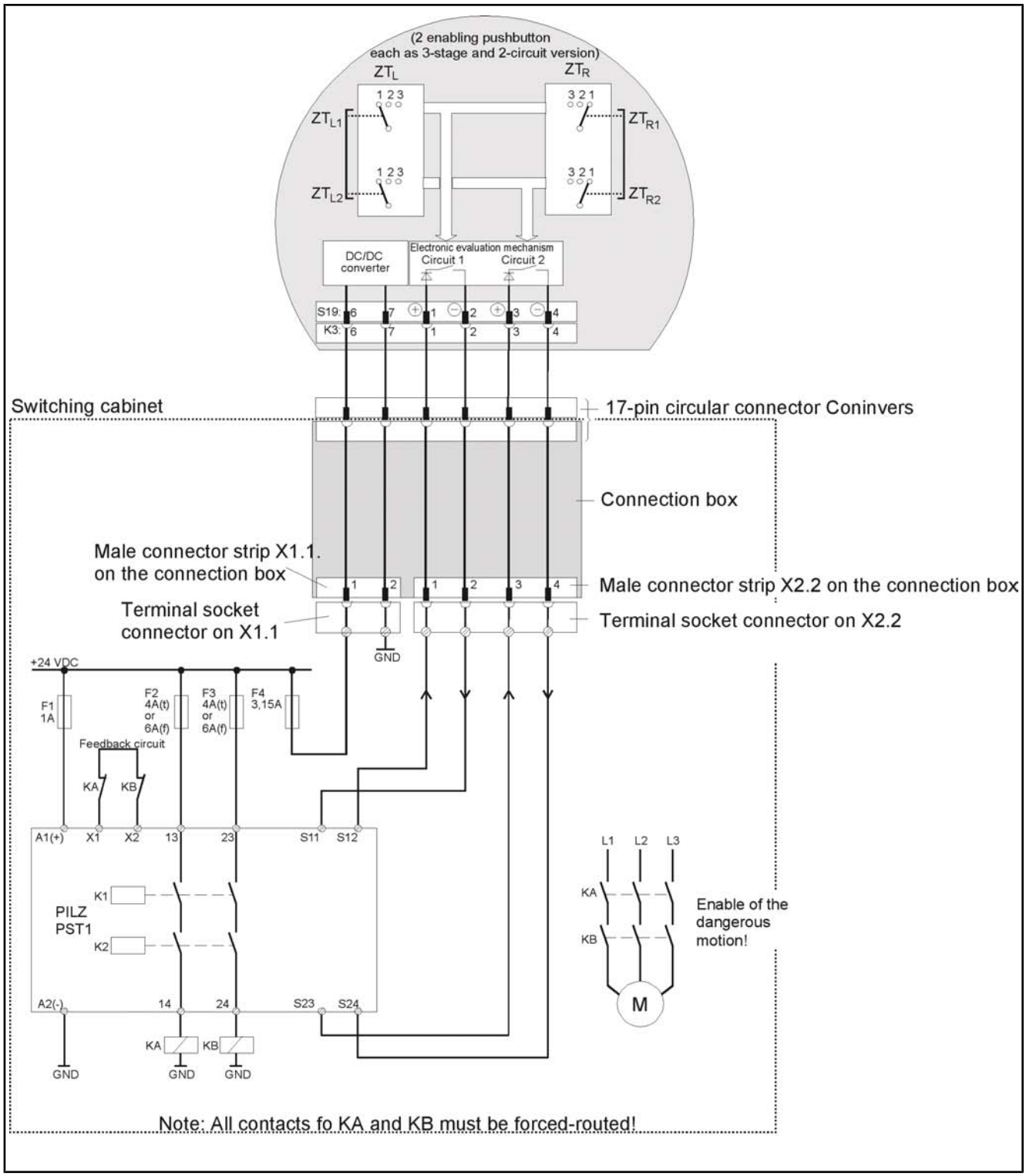
Example:

If, due to an error, a channel of the enabling device switches to 'enable' and after a specific period the second channel also signals 'enable' as a result of an error, a shutdown using the enabling switch would become impossible.

In addition, EN60204-1:1997 prescribes that the enabling device is to be connected to a stop of category 0 or 1, i.e. that the energy supply must be switched off.

Pin Assignments of the IndraControl VCH 08.1

## Connection Example with PILZ PST1 Monitoring Device




Suggestion for connection: Wiring of the enabling switches for safety category 3 and a PILZ monitoring device. Please also refer to the operating manual by PILZ for the PST1 device.

*Fig.7-13: Connection Example with PILZ PST1 Monitoring Device*

**Functional Sequence**

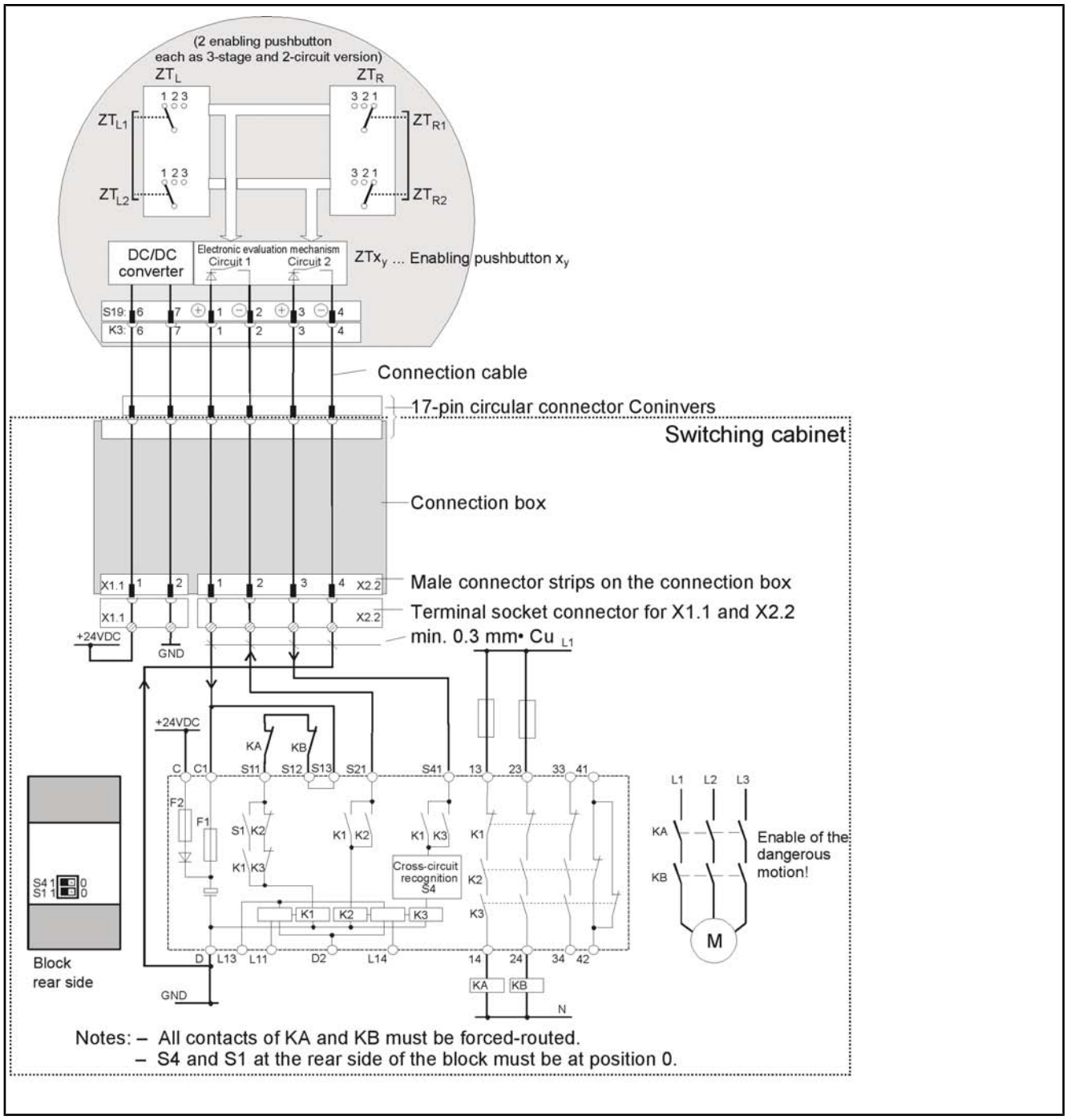
- Only with both enabling circuits connected "simultaneously" (by actuation of an enabling switch), do the two output relays K1 and K2 switch to the operating position and the output contacts 13-14 and 23-24 close.

- Under the following conditions the output relays K1 and K2 will not switch to the operating position:
  - Only one enabling circuit has been closed due to an error.
  - The tolerance value for simultaneity has been exceeded.
  - The feedback circuit X1-X2 is open.
- If an enabling circuit is interrupted after activation (be releasing the enabling switch or through a failure), the output relays K1 and K2 switch back to the neutral position. The operator controlled contacts between the connection terminal 13-14 and 23-24 will open. The output relays will only respond if both enabling circuits are opened and simultaneously closed again.

This procedure means that the requirement for a single failure not to lead to loss of the safety function is complied with. An individual failure is detected after the next cycle at the latest.

Pin Assignments of the IndraControl VCH 08.1

## Connection Example with ELAN SRB-NA-R-C.27/S1 Monitoring Device




Suggestion for connection: Wiring of the enabling switches for safety category 3 with the SRB-NA-R-C.27/S1 ELAN monitoring device. Please also refer to the operating manual of the SRB-NA-R-C.27/S1 device.

*Fig.7-14: Connection Example with ELAN SRB-NA-R-C.27/S1 Monitoring Device*

**Functional Sequence**

- Only with both enabling circuits connected "simultaneously" (by actuation of an enabling switch) do the two output relays K2 and K3 switch to operating position and the output contacts 13-14, 23-24 and 33-34 close.
- Under the following conditions the output relays K2 and K3 will not start:
  - Only one enabling circuit has been closed due to an error.

– The tolerance value for simultaneity has been exceeded.
– The feedback circuit S11-S12 is open.

- If an enabling circuit is interrupted after activation (be releasing the enabling switch or through a failure), the output relays K2 and K3 switch back to neutral position. The operator controlled contacts between the connection terminal 13-14 and 23-24 will open. The output relays will only respond if both enabling circuits are opened and simultaneously closed again.

This procedure means that the requirement for a single failure not to lead to loss of the safety function is complied with. An individual failure is detected after the next cycle at the latest.

### 7.3.6 X3: Ethernet Interface

The embedded terminal can be connected with an Ethernet network via an Ethernet interface.

| RJ45 female connector, 8-pin | |
|---|---|
| Type: | Ethernet 10Base T / 100Base X |
| Cable length: | Maximum 65 m; category 6 patch cable (in accordance with specifications) for VAC 30.2 and higher |
| Cable type: | shielded, twisted pair |
| Transmission rate: | 10 or 100 MBit/s; class D |

*Fig.7-15: Ethernet interface*

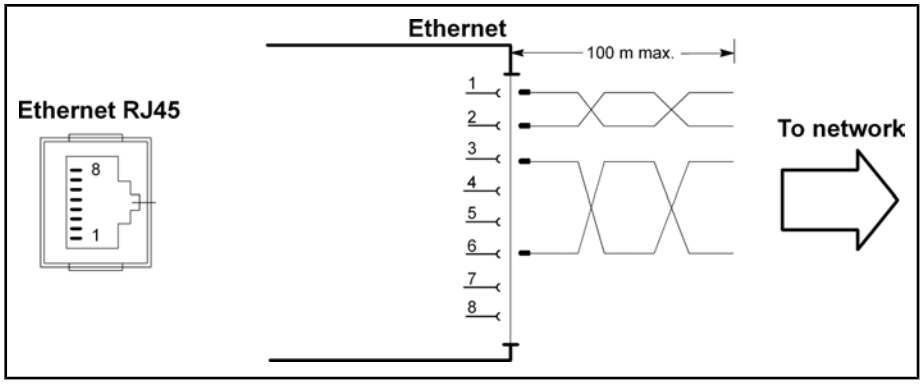



*Fig.7-16: Pin assignment of the Ethernet interface X3*

The configuration of the Ethernet interfaces is described in detail in chapter 9 "Software" on page 57.

## 7.4 Personality Function

**Network Settings from the Connection Module VAC 30.2**

In the majority of cases, the system features a continuous Ethernet network. However, M-Keys, STOP push buttons or enabling devices are permanently assigned to one control. The STOP push button and the enabling device are permanently wired to the connection module VAC 30.2. The network data of the IndraControl VCH 08.1 and the IP address of the control are stored in the connection module VAC 30.2 by means a storage function.

In this way different sections of a system can be visualized with one IndraControl VCH 08.1 via several IndraControl VAC 30.2 connection modules. With each change of the plugin location the IndraControl VCH 08.1 gets e.g. a new target IP address or UDP address.

Pin Assignments of the IndraControl VCH 08.1

The following functionality is being prepared:

As far as IndraWorks is concerned, in future the intelligent connection module IndraControl VAC 30.2 will serve as wildcard for a firmly projected CE operator terminal, for which the application is stored in the IndraControl VCH 08.1on a server in the network or ideally in the controller (see IndraWorks VCH configuration dialogs).

On every restart, the network settings that are read from the VAC 30.2 connection module are applied to the IndraControl VCH 08.1. These settings can be adjusted in Rexroth settings, see chapter 9.2.6 "Rexroth Settings" on page 61. These modifications are subsequently stored in the IndraControl VAC 30.2.

**Network Settings from the File in IndraControl VAC 30.2**

In certain cases the save function of the IndraControl VAC 30.2 is not available, for example, with the direct wiring of the IndraControl VCH 08.1 in the switching cabinet and also with a defective VAC 30.2 connection module. In such cases the network settings are stored in a file in the IndraControl VCH 08.1. However, the hand operated device is only connected to one single controller.

If a IndraControl VCH 08.1 that was previously connected to an IndraControl VAC 30.2 is directly wired in a switching cabinet by cable exchange, or connected to an IndraControl VAC 30.2 with a defective memory function, this is indicated with a message as illustrated in figure 7-17.

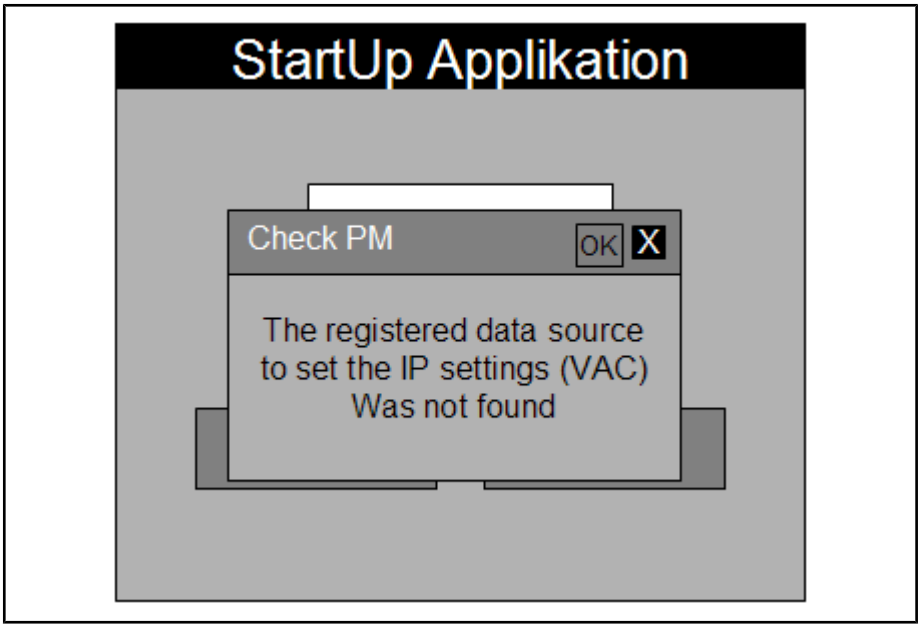



*Fig.7-17: Notice that external memory functions cannot be accessed.*

The message in figure 7-17 is confirmed with the "Apply data "key.

In the following dialog you can select whether or not you want to store the network settings in an inernal file in the IndraControl VCH 08.1:

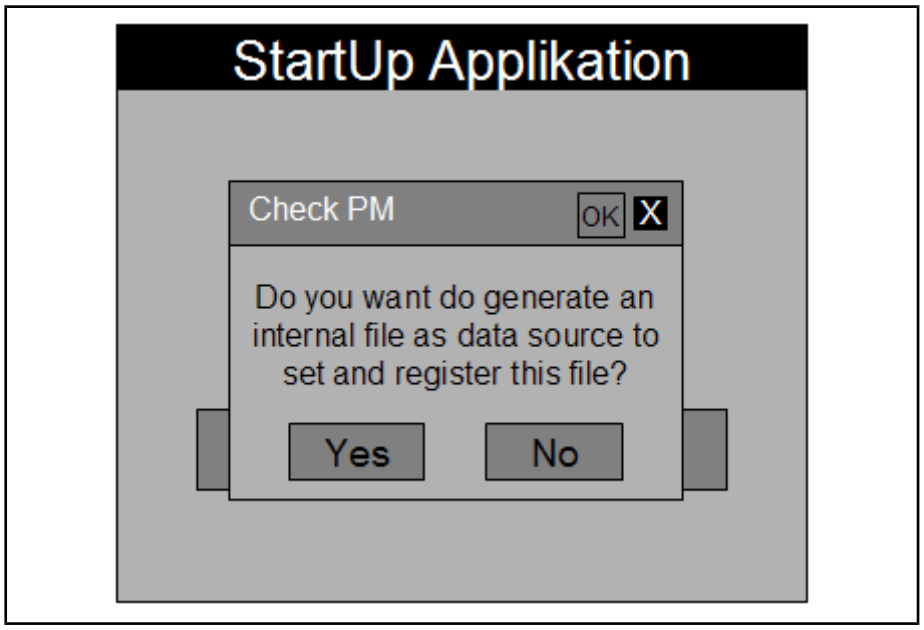



*Fig.7-18: Dialog for creating and internally storing network settings*

If this dialog is acknowledged by "Yes" and the subsequent saving of the internal file was successful, you will receive the following notice:

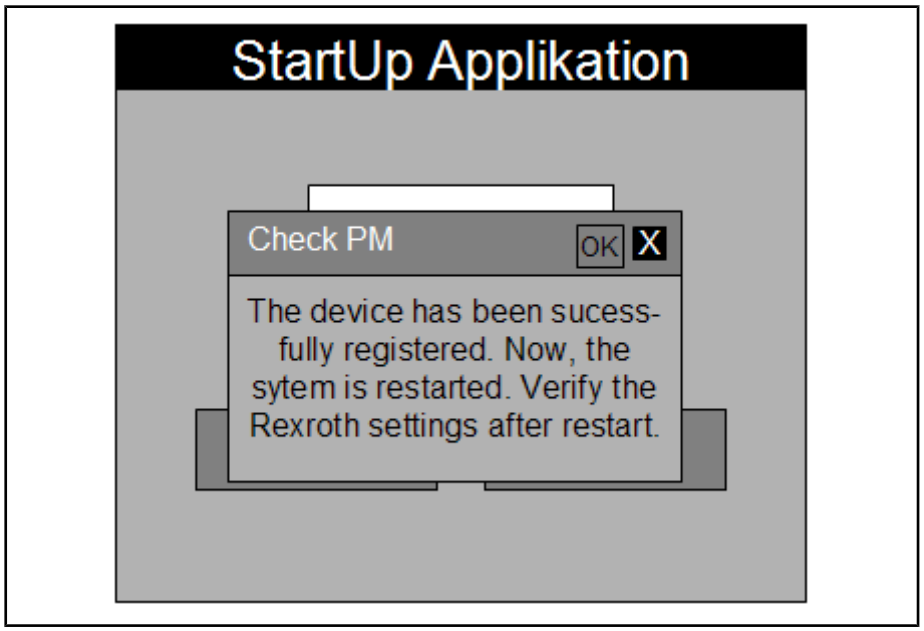

StartUp Applikation
Check PM
OK
X
The device has been sucess-fully registered. Now, the sytem is restarted. Verify the Rexroth settings after restart.

*Fig.7-19: Confirmation that network settings have been saved*

The notice in figure 7-19 is confirmed by means of the "Apply data "key.

The device will subsequently restart with the settings determined in "Rexroth settings". Check "Rexroth settings" after successful registration of the internal file.

**Priority of the Network Settings from the Connection Module IndraControl VAC 30.2**

If on switching on the IndraControl VCH 08.1 an IndraControl VAC 30.2 with memory function is recognized and the data for network configuration are successfully read, this configuration always has priority.

If, however, no configuration data are found in the VAC 30.2, the IndraControl VCH 08.1 starts with the internally saved settings.

In both cases this is communicated by the output sequence as illustrated in figures 7-17, 7-18 and 7-19.

# 8 Maintenance and Installation

## 8.1 General Information

The embedded terminals are maintenance free. However, some components are subject to wear and must be replaced.

**Maintenance**

Include the following measures in the maintenance schedule:

- Clean the screen surface at least once a week with an anti-static cloth or window cleaning agent that contains denatured alcohol.

CAUTION

**Disolving of the keypad surface and the display seal through contact with solvents!**

Do not use any solvents (e. g. paint thinner)!

- At least once a year, check all plug and terminal connections for the correct tightness and against damage.

  Check that cables are not broken or crushed. Replace damaged parts immediately.

## 8.2 LCD Display

A fading backlight leads to a progressive deterioration of the LCD display's readability. This means that a backlight exchange is necessary. For further information please contact the Bosch Rexroth Service.

## 8.3 Maintenance of the IndraControl VCH 08.1

The IndraControl VCH 08.1is designed for the use in an industrial environment. It does not need any special maintenance.

We recommend users to keep the device away from humidity, oils and emulsions.

If a particular degree of fouling is achieved - from the ergonomic point of view - the IndraControl VCH 08.1 should be cleaned with a smooth, dry and fuzz-free cloth to restore e. g. the full grip.

# 9 Software

## 9.1 Overview

Thehand-held terminal IndraControl VCH 08.1 is supplied with a pre-installed software which is permanently stored in the Flash of the device. This software is also referred to as "Image" as it combines all software content in a single file. The Image contains the Windows CE operating system kernel and possibly additional applications.

This description applies to Images from Version 1.00 and higher (indication of the version via configuration tool, see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66).

The IndraControl VCH 08.1 IndraControl VCH 08.1 is equipped with the following software as standard:

- Windows CE 5.0 .NET operating system:
- Flash file system:
  - FlashDrv
- Pre-installed application programs:
  - VI-Composer Runtime
  - Standard appliacations
  - Configuration tool (extension in system control for the configuration of contrast, brightness, backlight, screen saver, joystick and potentiometer calibration, deleting of registry, image update, ...)
  - "Rexroth settings"

## 9.2 Starting the IndraControl VCH 08.1

### 9.2.1 General Information

The following setting dialogs of the IndraControl VCH 08.1 are available:

- In "Start-up application" you select whether to start the customer application or change the system settings, for further information about this see chapter 9.2 "Starting the IndraControl VCH 08.1" on page 57.
- In "Service application" the access password for the "Service dialog" is requested, for further information about this see chapter 9.2.4 "Service Dialog" on page 60.
- In "Service dialog" you can assign a new password and you can access the setting dialogs "Rexroth settings" and "Config tool", for this see chapter 9.2.4 "Service Dialog" on page 60.
- In "Rexroth settings" you can enter the network parameters, for this see chapter 9.2.6 "Rexroth Settings" on page 61.
- In "Config tool" you can set some of the sotware and hardware parameters, for this see chapter 9.2.5 "Config Tool" on page 61.

The following overview (fig. 9-1 "Structure of the setting dialogs" on page 58) highlights the structure of the setting dialogs:

Software

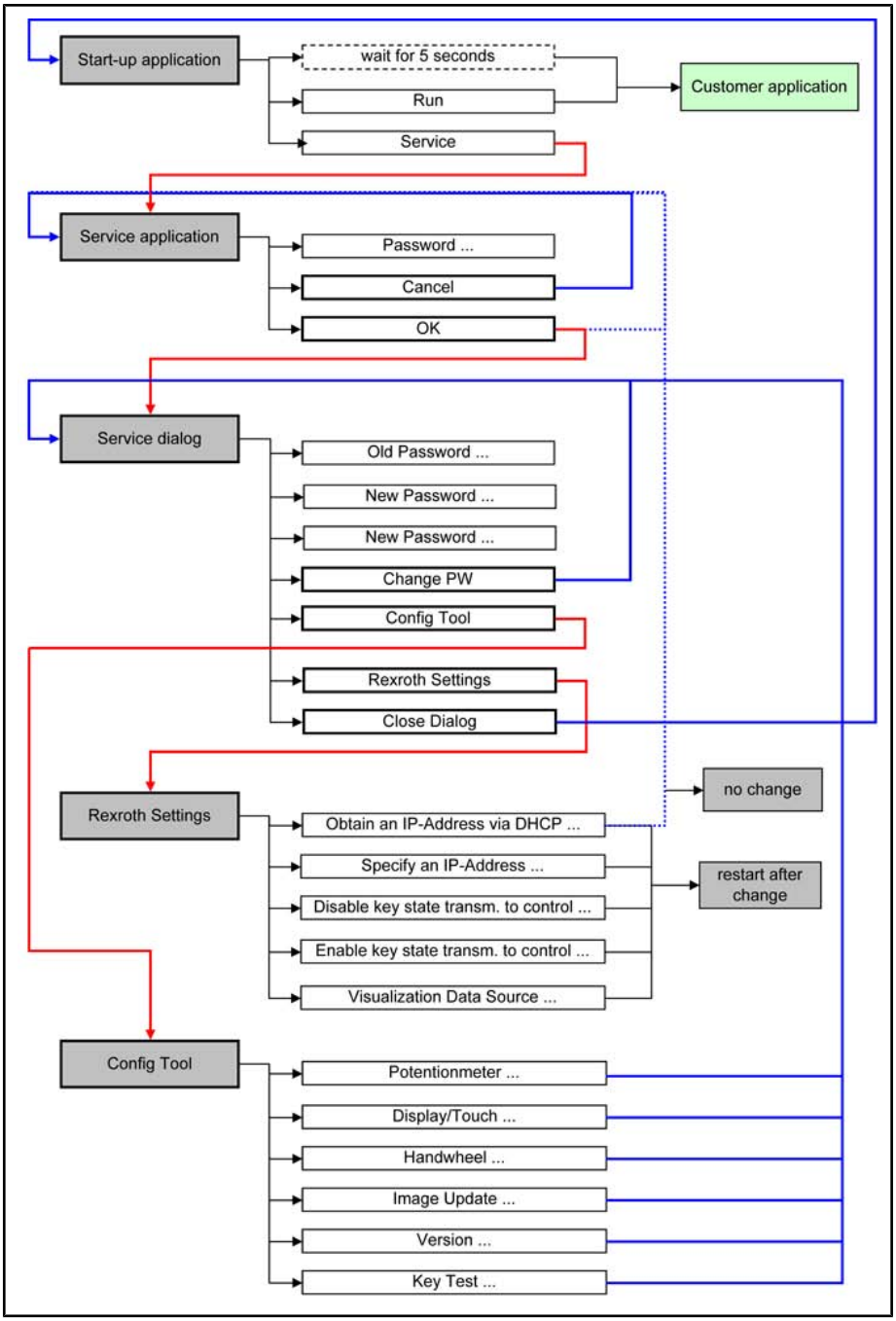



*Fig.9-1: Structure of the setting dialogs*

All inputs in these dialogs as well as the navigation is exclusively carried out via keypad. The following key assignments apply to some functions, see fig. 9-2 "Key assignment of the Start-up dialog" on page 59.

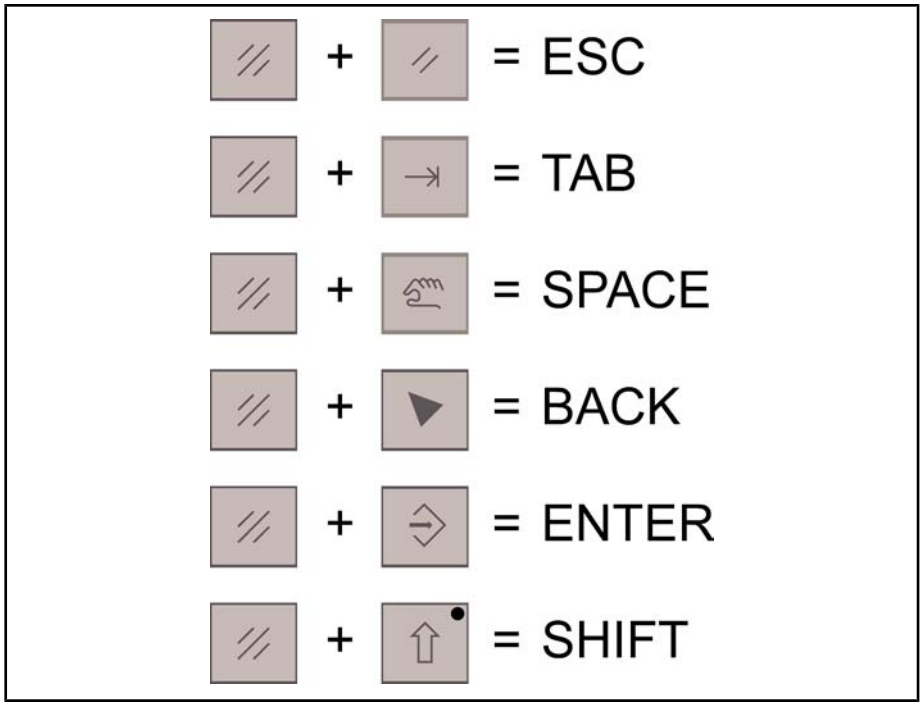



*Fig.9-2: Key assignment of the Start-up dialog*

## 9.2.2 Start-up Application

The "Start-up application" is activated after the supply voltage has been applied to the IndraControl VCH 08.1 and the operating system has been started.

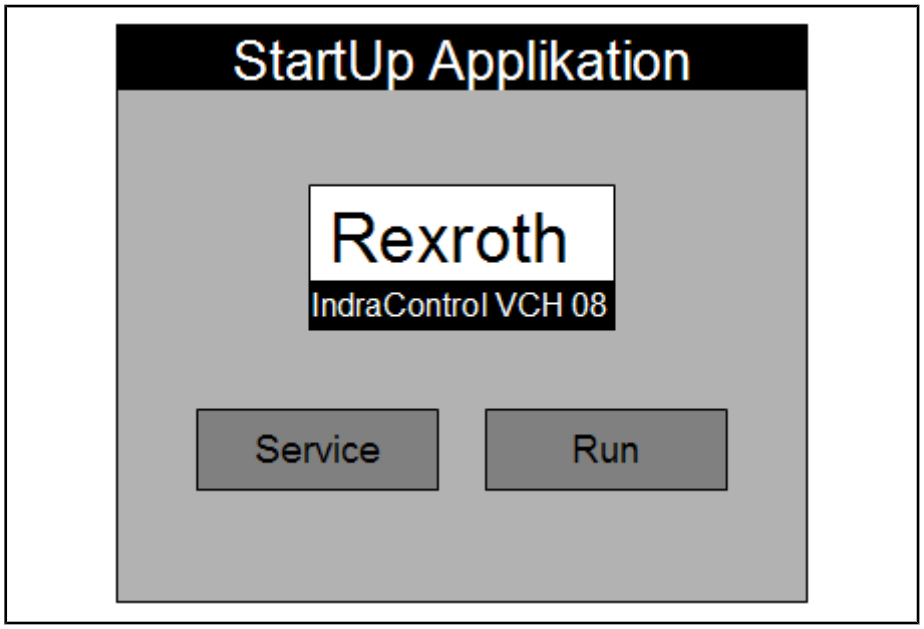



*Fig.9-3: Start-up application*

In this dialog you can reach the system settings via the "Service" button or you can start the customer application by actuating "Run". You may only use the cursor buttons to make your selection. If you do not select an application within five seconds, the customer application will start automatically.

Software

### 9.2.3 Customer Application

The customer application can be started in the Start-up Application via the "Run" button, see chapter 9.2.2 "Start-up Application " on page 59. Alternatively the customer application is automatically started after five seconds.

### 9.2.4 Service Dialog

The customer application can be started in the Start-up Application via the "Run" button, see chapter 9.2.2 "Start-up Application " on page 59. You can configure the network and the hardware in the Service dialog.

After calling up the Service dialog a password request is displayed, see fig. 9-4 "Entering the password" on page 60. The standard password is "+-+-". Please only enter the password using the keypad.

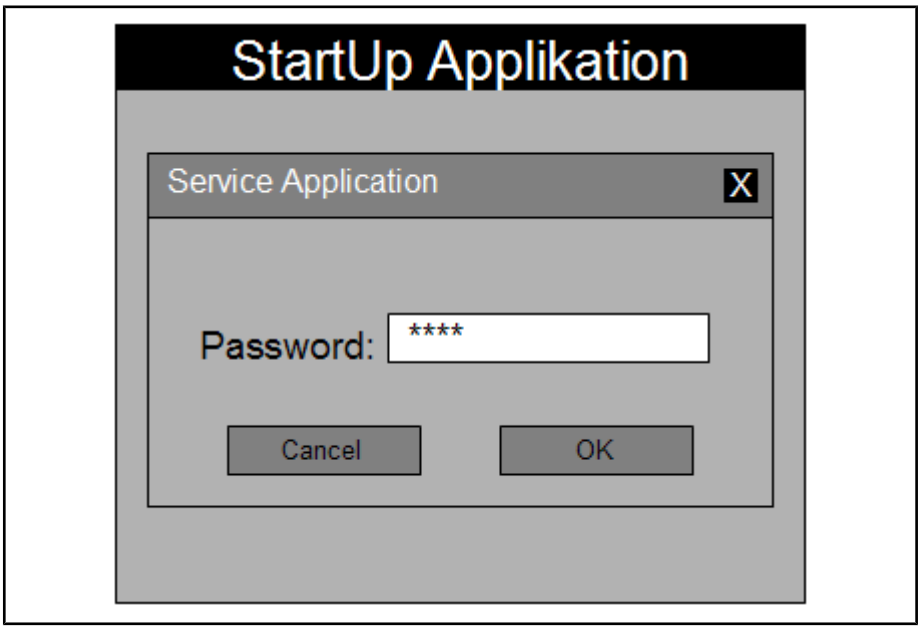



*Fig.9-4: Entering the password*

If the password is entered correctly then the Service dialog is displayed, see fig. 9-5 "Service dialog" on page 61.

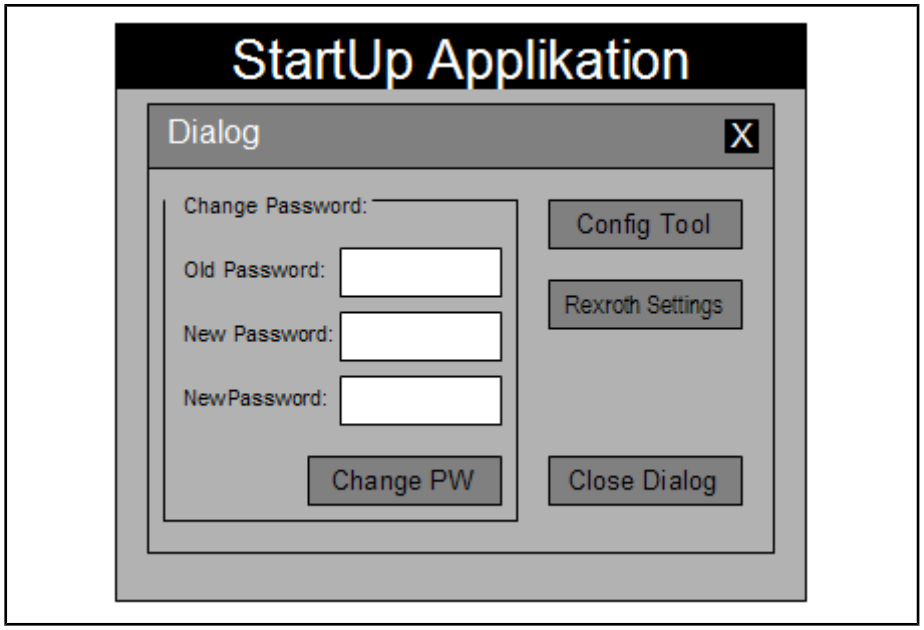



*Fig.9-5: Service dialog*

You can assign a new password in Service dialog. In addition, from this dialog you can also reach "Config Tool" (see chapter 9.2.5 "Config Tool" on page 61) and "Rexroth settings" (see chapter 9.2.6 "Rexroth Settings" on page 61).

## 9.2.5 Config Tool

The config tool is started in Service dialog via the "Config tool" button, see fig. 9-5 "Service dialog" on page 61.

The following settings are available in Config tool:

- Adjustment of the brightness and contrast (however, these settings are mainly adjusted via standard application).
- Adjustment and information display by means of the override and the hand wheel.
- Display of the image version.
- Activation of a system update.
- Testing the keypad.

Detailed information about the individual setting dialogs can be found in chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

## 9.2.6 Rexroth Settings

The Rexroth settings are started in Service dialog via the "Rexroth settings" button, see fig. 9-5 "Service dialog" on page 61. The " Rexroth settings" dialog is devided into two tabs ("Network settings" and "Application settings").

The "Rexroth settings" read the network data from the connection module VAC 30 out, displays this data, and allows the editing of the values, see fig. 9-6 "Network settings" on page 62.

Software

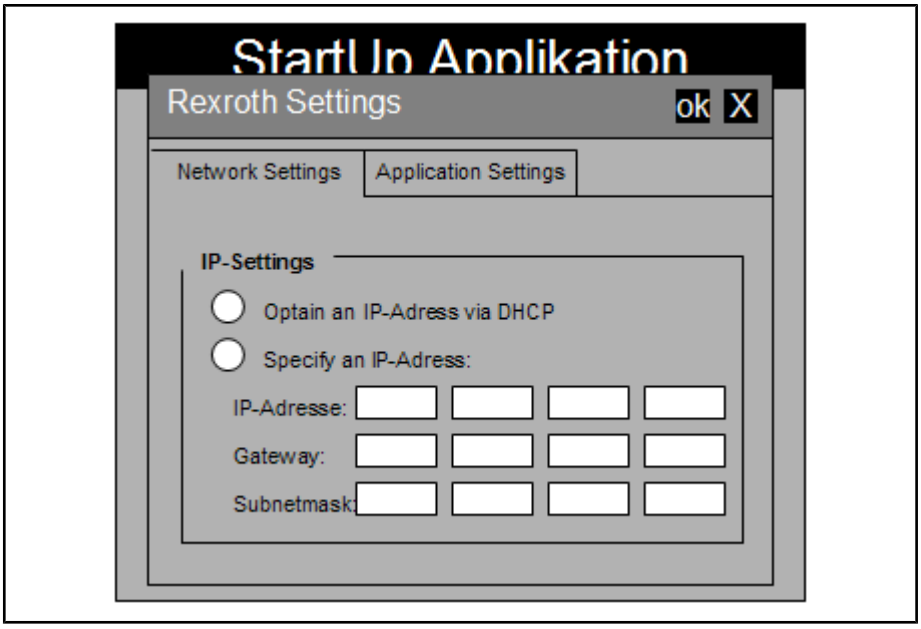



*Fig.9-6: Network settings*

**Obtain an IP Address via DHCP**

The network parameters are automatically assigned via DHCP.

**Specify an IP Address**

The network parameters must be manually configured.

The following data is required:

- **IP Address:**
  Manual input of the device's IP address.
- **Gateway:**
  Manual input of the Gateway.
- **Subnet Mask:**
  Manual input of the Subnet Mask.

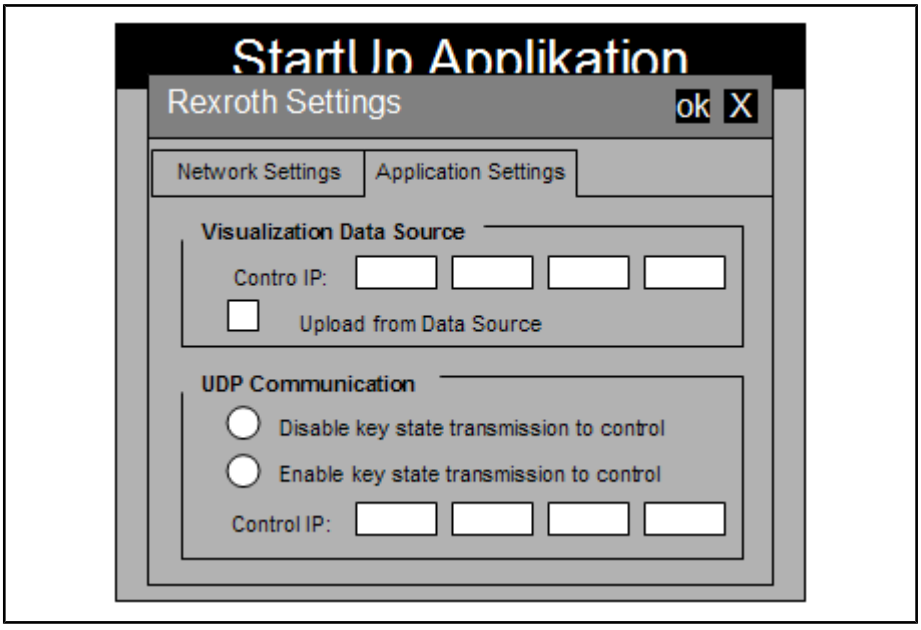



*Fig.9-7: Visualization and communication settings*

**Visualization Data Source**

The visualization software can reside locally on the IndraControl VCH 08.1 or on the control to be visualized.

- **Control IP**:

  The IP address of the controller with which the visualization screen is to be connected.

- **Upload from data source**:

  Select this function if the visualization screen is to be loaded from the controller to the terminal and executed there.

  If "Upload from data dource" has been selected, it is not the locally saved visualization software that is started, but the application is loaded an started from the controller to be visualized. If the loading process fails, an error message is generated and the locally stored application is started.

**Disable Key State Transmission to Control**

The UDP telegrams are not transmitted to the control.

**Enable Key State Transmission to Control**

- **Control IP**:

  IP address of the control to which the UDP telegrams are to be sent.

  The following data is sent to the control (control IP) via UDP telegram:

  – Keyboard codes for IndraControl VCH 08.1

  – Data concerning the additional elements, such as hand wheel, override, key switches.

After editing the values and confirming using the "ENTER" key, the data is rewritten to the connection module or to the local file and the IndraControl VCH 08.1 is restarted, which causes the network driver to be initialized with modified data.

### 9.2.7 Basic Settings

All the basic settings of the IndraControl VCH 08.1 are carried out via "Rexroth settings". In the event of an operating system update, Rexroth settings is started automatically.

The Rexroth settings of the IndraControl VCH 08.1are read from the IndraControl VAC 30.2 connection module, for this see chapter 7.4 "Personality Function" on page 51.

On initial start-up of the IndraControl VAC 30.2 all values are set to standard values (Obtain an IP-address via DHCP, disable UDP).

## 9.3 Evaluating the Commands of the Operating Elements

### 9.3.1 General Information

A variety of operating actions can be triggered by the keys on the front panel. In addition to the block with the navigation keys that provides conventional functions of the cursor, enter and escape keys, function keys for the execution of special tasks are fitted below the display. Depending on the design – in addition to the keys – further operating elements such as override or hand wheel can be provided on the front panel.

### 9.3.2 Evaluation of the Operating Status in the Control

The operating states of the F keys, the enabling device, and the additional operating elements are transmitted directly to the controller by means of a real time protocol via Ethernet communication. In the controller, you have the possibility to evaluate the status of the operating elements by means of a function block. The bit assignment within the function block to the operating elements is specified and cannot be modified.

The keys of the navigation key block are not transmitted into the controller.

Software

| UDP bit | Function block Controller | VEH | VCH | Note |
|---|---|---|---|---|
| 0 | data[0].7 | L1 | | M-key |
| 1 | data[0].6 | L2 | | M-key |
| 2 | data[0].5 | L3 | | M-key |
| 3 | data[0].4 | L4 | | M-key |
| 4 | data[0].3 | L5 | | M-key |
| 5 | data[0].2 | L6 | | M-key |
| 6 | data[0].1 | L7 | | M-key |
| 7 | data[0].0 | L8 | | M-key |
| 8 | data[1].7 | R1 | // | M-key |
| 9 | data[1].6 | R2 | hand | M-key |
| 10 | data[1].5 | R3 | ->\| | M-key |
| 11 | data[1].4 | R4 | | M-key |
| 12 | data[1].3 | R5 | + | M-key |
| 13 | data[1].2 | R6 | - | M-key |
| 14 | data[1].1 | R7 | | M-key |
| 15 | data[1].0 | R8 | | M-key |
| 16 | data[2].7 | 1+ | F1 | Jog key |
| 17 | data[2].6 | 1- | F7 | Jog key |
| 18 | data[2].5 | 2+ | F2 | Jog key |
| 19 | data[2].4 | 2- | F8 | Jog key |
| 20 | data[2].3 | 3+ | F3 | Jog key |
| 21 | data[2].2 | 3- | F9 | Jog key |
| 22 | data[2].1 | 4+ | F4 | Jog key |
| 23 | data[2].0 | 4- | F10 | Jog key |
| 24 | data[3].7 | 5+ | F5 | Jog key |
| 25 | data[3].6 | 5- | F11 | Jog key |
| 26 | data[3].5 | 6+ | F6 | Jog key |
| 27 | data[3].4 | 6- | F12 | Jog key |
| 28 | data[3].3 | 0 | 0 | device identification 1 |
| 29 | data[3].2 | 0 | 1 | device identification 0 |
| 30 | data[3].1 | enable | enable | enabling switch |
| 31 | data[3].0 | panic | panic | enabling switch |

*Fig.9-8: Bit assignment with function block*

| UDP bit | Function block Controller | VEH | VCH | Note |
|---|---|---|---|---|
| 32 | data[4].7 | | | |
| 33 | data[4].6 | | | |
| 34 | data[4].5 | | | |

| UDP bit | Function block Controller | VEH | VCH | Note |
|---|---|---|---|---|
| 35 | data[4].4 | | | |
| 36 | data[4].3 | | | |
| 37 | data[4].2 | | | |
| 38 | data[4].1 | | | |
| 39 | data[4].0 | | | |
| 40 | data[5].7 | | | |
| 41 | data[5].6 | | | |
| 42 | data[5].5 | | | |
| 43 | data[5].4 | | | |
| 44 | data[5].3 | OvR.3 | OvR.3 | override |
| 45 | data[5].2 | OvR.2 | OvR.2 | override |
| 46 | data[5].1 | OvR.1 | OvR.1 | override |
| 47 | data[5].0 | OvR.0 | OvR.0 | override |
| 48 | data[6].7 | HW.15 | HW.15 | hand wheel |
| 49 | data[6].6 | HW.14 | HW.14 | hand wheel |
| 50 | data[6].5 | HW.13 | HW.13 | hand wheel |
| 51 | data[6].4 | HW.12 | HW.12 | hand wheel |
| 52 | data[6].3 | HW.11 | HW.11 | hand wheel |
| 53 | data[6].2 | HW.10 | HW.10 | hand wheel |
| 54 | data[6].1 | HW.9 | HW.9 | hand wheel |
| 55 | data[7].0 | HW.8 | HW.8 | hand wheel |
| 56 | data[7].7 | HW.7 | HW.7 | hand wheel |
| 57 | data[7].6 | HW.6 | HW.6 | hand wheel |
| 58 | data[7].5 | HW.5 | HW.5 | hand wheel |
| 59 | data[7].4 | HW.4 | HW.4 | hand wheel |
| 60 | data[7].3 | HW.3 | HW.3 | hand wheel |
| 61 | data[7].2 | HW.2 | HW.2 | hand wheel |
| 62 | data[7].1 | HW.1 | HW.1 | hand wheel |
| 63 | data[7].0 | HW.0 | HW.0 | hand wheel |

*Fig.9-9: Bit assignment for additional input devices*

## 9.4 Remote Software ActiveSync

This software provides for the synchronization and transmission of data from and to a PC and as debug interface.

The ActiveSync remote software is a Microsoft product and can be obtained for free via the following download address:

http://www.microsoft.com/windowsmobile/downloads/activesync38.mspx

# 9.5 Operating Notes for the VCH 08.1

## 9.5.1 General Information

This chapter describes deviations from conventional Windows CE devices and Rexroth-specific settings.

## 9.5.2 Setting of Date and Time

The setting options for date and time are not yet supported by the system.

## 9.5.3 Configuration Tool (Config Tool)

### General Information

The Config tool serves for the calibrating, the simple function checking of the operating elements and for setting the start-up functions.

The Config tool can be called in the start-up mask as follows:

**Service ▸ Configuration tool**

☞ The appearance of the Config tool depends on the operating elements installed in the IndraControl VCH 08.1 (the menus for OV potentiometer, joystick and hand wheel are only displayed if these operating elements are integrated in the device).

If you have executed any changes to the configuration and you exit the program, you are given the option to permanently saving all the changes in the registry via "Registry Backup".

For specific modifications (e.g calibration) a window containing the following message and selection option appears on exiting the program:

"Data has changed! Do you want to write the registry to the flash? Yes/No"

When you chose "No" the settings are not saved and will be lost on switching off the IndraControl VCH 08.1.

When chosing "Yes" the settings are permanently saved to the flash and are maintained when switching the device back on again. During the saving process the device is blocked for a maximum of 10 seconds.

### Potentiometer Calibration

You will find the "potentiometer" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

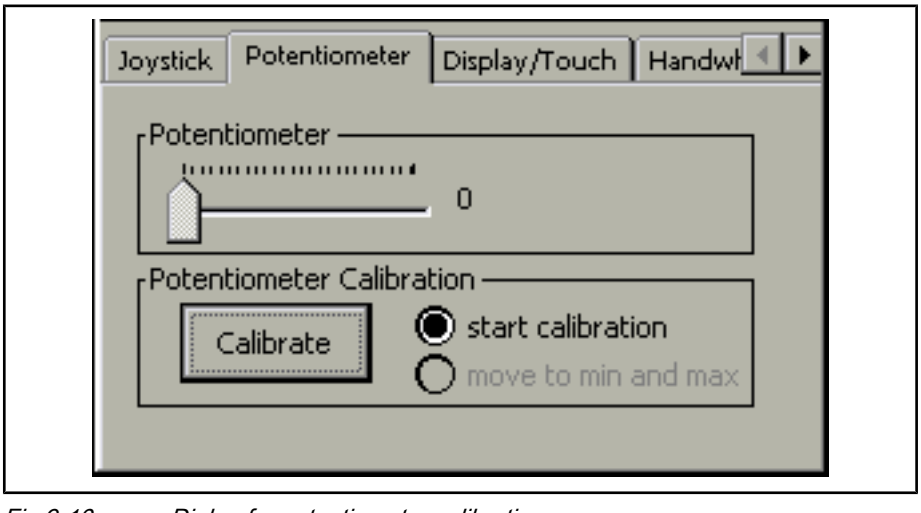



*Fig.9-10: Dialog for potentiometer calibration*

The potentiometer calibration is started via the "Calibrate" button, see fig. 9-10 "Dialog for potentiometer calibration" on page 66. The slider moves analogously to the potentiometer setting. For verification purposes the current value is also displayed as a numeric value. After the calibration has been completed this number indicates the current value of the potentiometer (value range: 0 to 127).

## Display Settings

You will find the "display/touch" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

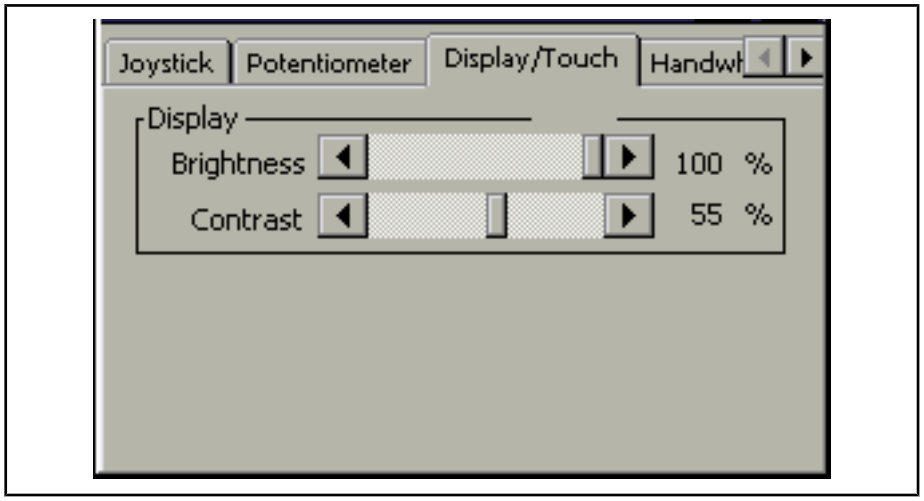



*Fig.9-11: Dialog for display settings*

In this dialog you can set the brightness and contrast.

## Setting the Zero Point of the Handwheel

You will find the "hand wheel" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

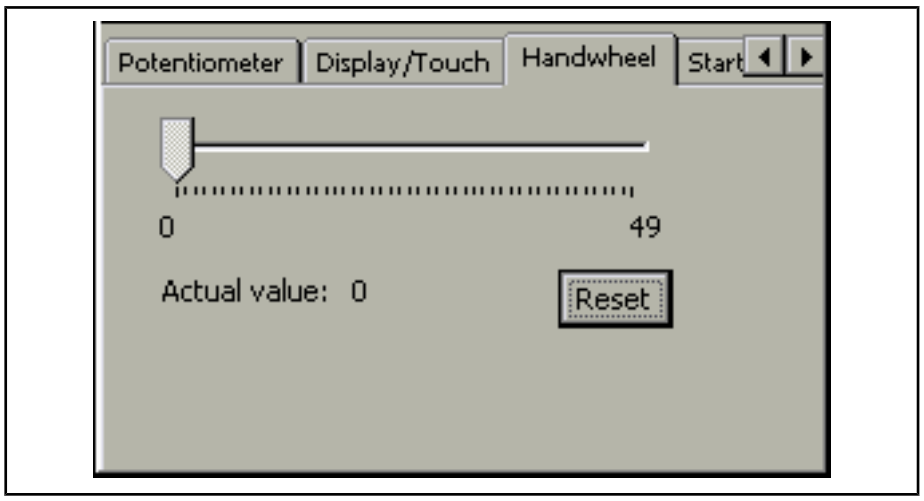



*Fig.9-12: Dialog for handwheel settings*

The hand wheel provides a 16 bit value that can be freely processed in customer application (e.g.: 0-65535, +/-32767, ...).

The value ranging from 0 to 65535 is displayed in the dialog box. The value of the hand wheel is set to 0 when switching on the device. On actuation of the "Reset" key the value of the hand wheel is reset to 0.

## Switch-on Actions for Restart (Start-up)

You will find the "start-up" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

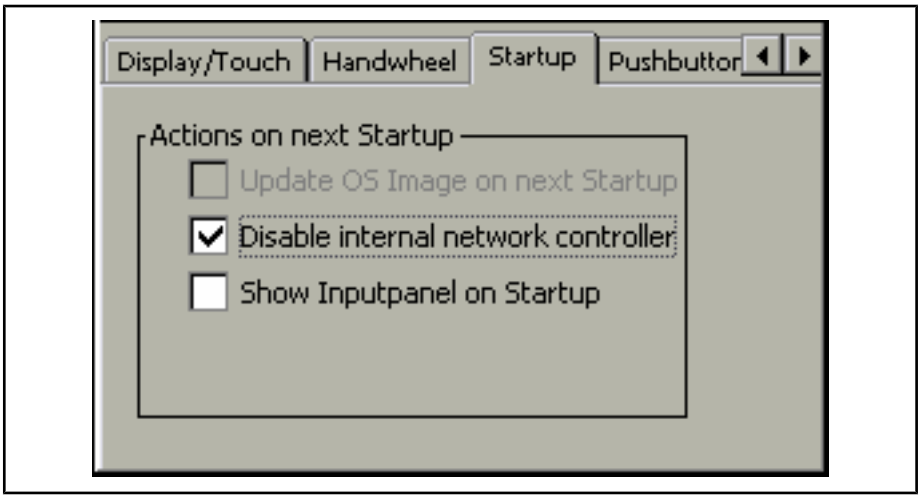



*Fig.9-13: Dialog for restart*

The setting options on this register are being prepared and are currently unavailable.

## System Update

You will find the "system image" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

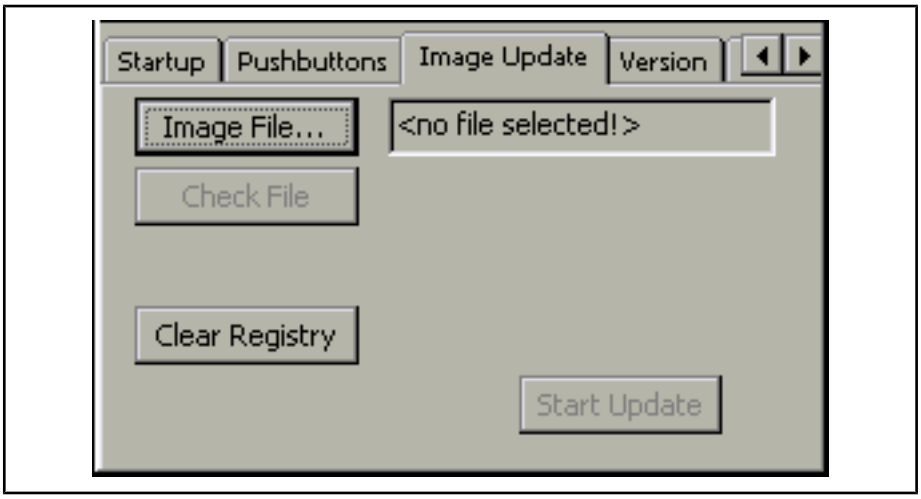



*Fig.9-14: Dialog for image update*

This register serves the loading of an image file into the IndraControl VCH 08.1. You can actualize the operating system with a newly loaded image file.

---

☞ The image file may be copied into any desired directory except the \FlashDrv directory.

It is mandatory to execute "check file" before every image update. The "tmp" directory may be considered as a sensible storage place for the image file.

---

**Image File** Here, a new WinCE image file can be selected in the file-selecting dialog.

In the case of an image update, the registry is automatically deleted and the IndraControl VCH 08.1 is restarted. The IndraControl VCH 08.1 then starts with the factory settings and all settings (touch screen, joystick, override potentiometer, system controls, ...) must be saved again.

**Check File** The selected file can be checked for validity. "Check file" is only active if a valid image file has been selected.

**Start Update** This procedure means that the update process is started and the progress status is displayed. "Start update" is only active if the selected image file has been successfully checked for validity using "Check File".

**Clear Registry** By selecting this item the registry is deleted and the IndraControl VCH 08.1 is automatically restarted. The IndraControl VCH 08.1 then starts with the factory settings and all settings (touch-screen, joystick and override potentiometer, system control, ...) must be saved again.

## Information on Version

You can find the "version" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

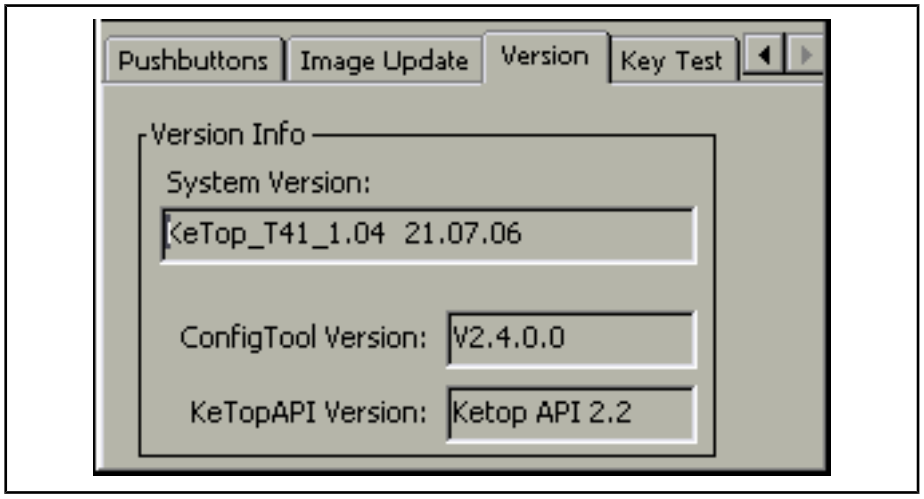



*Fig.9-15: Display of the version information*

This window displays information on the version of the WinCE-SW image and the Config tool and IndraControl VCH 08.1 version installed at the IndraControl VCH 08.1.

## Checking the Keyboard

You will find the "Key test" register in the "Config tool", see chapter 9.5.3 " Configuration Tool (Config Tool)" on page 66.

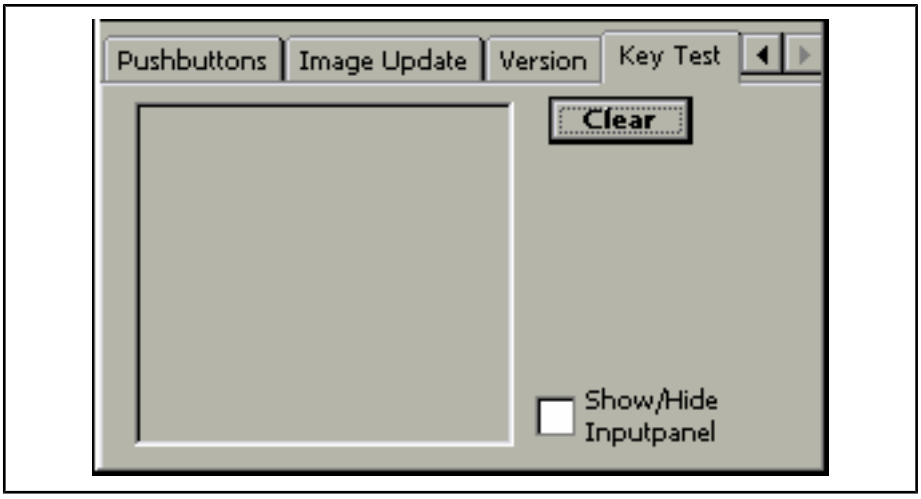



*Fig.9-16: Test field for checking the keyboard*

This register is used for checking the keyboard.

On pressing a key the asigned virtual key code (HEX) and the event "pressed" is displayed.

On releasing a key the assigned virtual key code (HEX) and the event "released" is displayed.

## 9.5.4 Saving Data

The saving of data must be carried out in the "FlashDrv" directory. The content of other directories is not saved on switching off.

## 9.5.5 Transmission of Data

**Transmission via ActiveSync**

For information about this, see chapter 9.4 "Remote Software ActiveSync" on page 65.

# 10 Disposal and Environmental Protection

## 10.1 Disposal

### 10.1.1 Products

Our products can be returned to us free of charge for disposal. However, it is a precondition that the products are free of oil, grease or other dirt.

Furthermore, the products returned for disposal must not contain any undue foreign matter or foreign component.

Please send the products free domicile to the following address:

Bosch Rexroth AG

Electric Drives and Controls

Bürgermeister-Dr.-Nebel-Strasse 2

D-97816 Lohr am Main

### 10.1.2 Packaging Materials

The packaging materials consist of cardboard, wood and polystyrene. These materials can be easily recycled in any municipal recycling system. For ecological reasons, please refrain from returning the empty packages to us.

## 10.2 Environmental Protection

### 10.2.1 No Release of Hazardous Substances

Our products do not contain any hazardous substances which may be released in the case of appropriate use. Accordingly, our products will normally not have any negative effect on the environment.

### 10.2.2 Materials Contained in the Products

#### Electronic Devices

Electronic devices mainly contain:

- steel
- aluminum
- copper
- synthetic materials
- electronic components and modules

#### Motors

Motors mainly contain:

- steel
- aluminum
- copper
- brass
- magnetic materials
- electronic components and modules

## 10.2.3 Recycling

Due to their high content of metal, most of the product components can be recycled. In order to recycle the metal in the best possible way, the products must be disassembled into individual modules.

Metals contained in electric and electronic modules can also be recycled by means of special separation processes. The synthetic materials remaining after these processes can be thermally recycled.

If the products contain batteries or rechargeable batteries, these batteries are to be removed before recycling and disposed of.

# 11 Ordering Information

## 11.1 Type Code

### 11.1.1 General Information

The hand-held terminal IndraControl VCH 08.1 has the following features pursuant to the type code illustrated below:

Ordering Information

## 11.1.2 IndraControl VCH 08.1

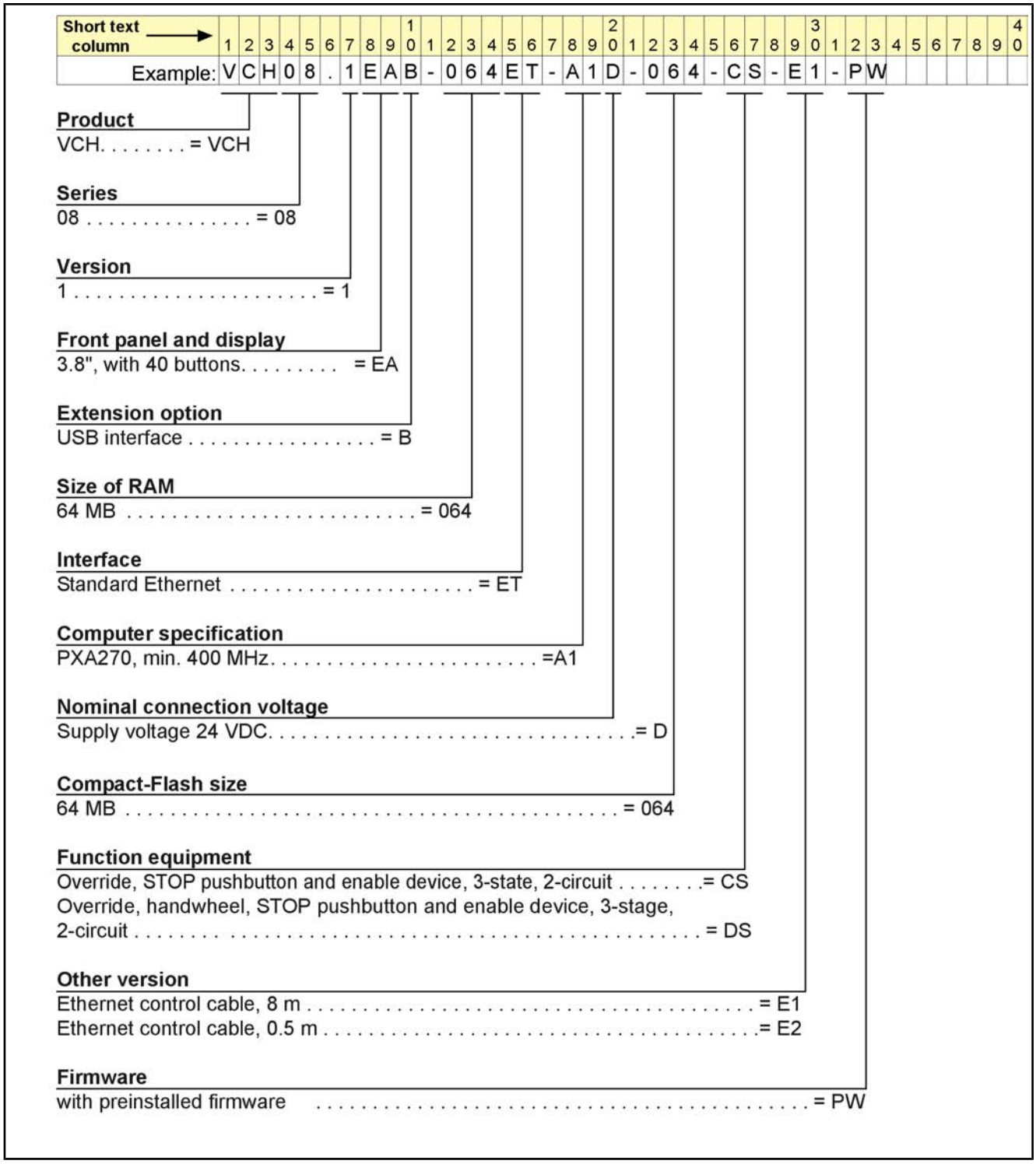

Short text column
1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40
Example: VCH08.1EAB-064ET-A1D-064-CS-E1-PW
Product
VCH. . . . . = VCH
Series
08 . . . . . = 08
Version
1 . . . . . = 1
Front panel and display
3.8", with 40 buttons. . . . . = EA
Extension option
USB interface . . . . . = B
Size of RAM
64 MB . . . . . = 064
Interface
Standard Ethernet . . . . . = ET
Computer specification
PXA270, min. 400 MHz. . . . . =A1
Nominal connection voltage
Supply voltage 24 VDC. . . . . .= D
Compact-Flash size
64 MB . . . . . = 064
Function equipment
Override, STOP pushbutton and enable device, 3-state, 2-circuit . . . . . .= CS
Override, handwheel, STOP pushbutton and enable device, 3-stage, 2-circuit . . . . . = DS
Other version
Ethernet control cable, 8 m . . . . . = E1
Ethernet control cable, 0.5 m . . . . . .= E2
Firmware
with preinstalled firmware . . . . . = PW

*Fig.11-1: Type code of the IndraControl VAC 08.1*

### 11.1.3 IndraControl VAC 30.2

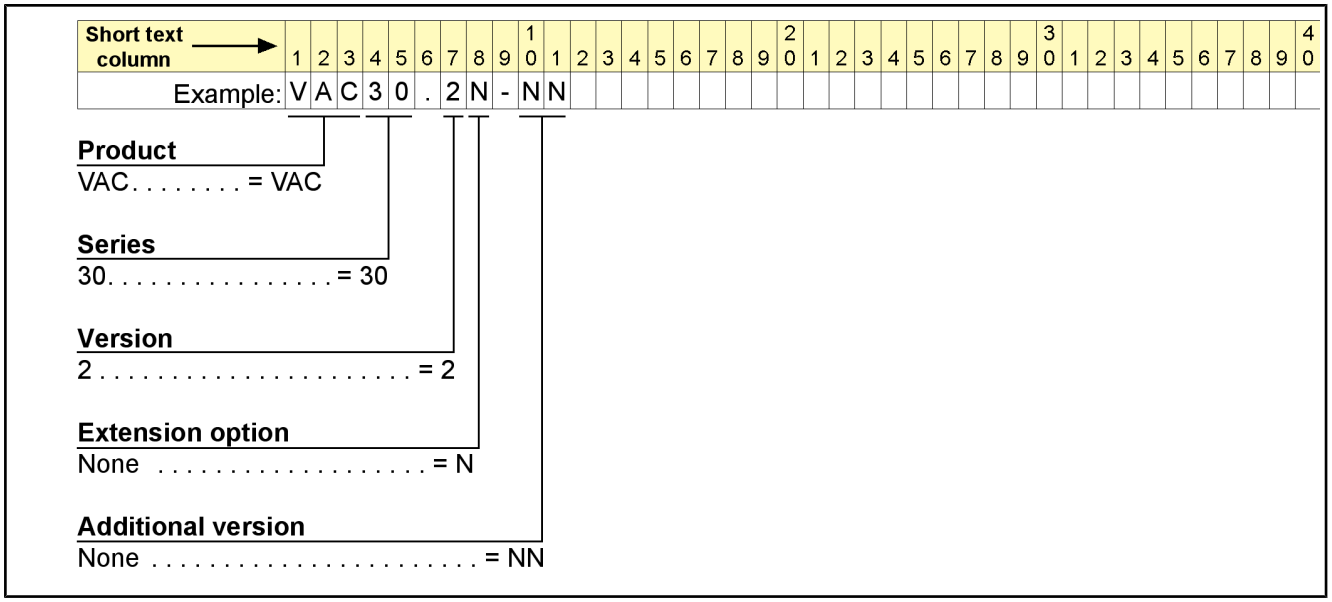

Short text column
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Example: V A C 3 0 . 2 N - N N
Product
VAC . . . . . = VAC
Series
30. . . . . = 30
Version
2 . . . . . = 2
Extension option
None . . . . . = N
Additional version
None . . . . . = NN

*Fig.11-2: Type code of the IndraControl VAC 30.2*

## 11.2 Accessories

### 11.2.1 Wall Bracket

| Ordering designation | Part number | Description |
|---|---|---|
| VAS01.1-002-NNN-NN | R9111170839 | Wall bracket for IndraControl VCH 08.1 |
| RKB0011/0XX,0 | R911316888 | Category 6 patch cable, freely designable, maximum 65 m |

*Fig.11-3: Part number of the wall bracket for the IndraControl VEH 08.1*

## 11.3 Spare Parts

### 11.3.1 Connection Cable

| Ordering designation | Part number | Description |
|---|---|---|
| VAS05.1-002-008-NN | R911170863 | Connection cable for IndraControl VCH 08.1, 17-pin |
| VAS05.1-002-0M5-NN | R911171027 | Connection cable for IndraControl VCH 08.1, 17-pin, 0.5 m |
| RKS0009/016,0 | R911171028 | Extension cable for VAS05.1-002-0M5-NN connection cable 0.5 m |

*Fig.11-4: Part number of the connection cable for the IndraControl VEH 08.1*

# 12 Service and Support

## 12.1 Helpdesk

Our service helpdesk at our headquarters in Lohr, Germany, will assist you with all kinds of inquiries.

Contact us:

- By phone through the Service Call Entry Center,
  Monday to Friday 7:00 am - 6:00 pm CET
  **+49 (0) 9352 40 50 60**
- By fax
  **+49 (0) 9352 40 49 41**
- By e-mail: service.svc@boschrexroth.de

## 12.2 Service Hotline

Out of helpdesk hours please contact our German service department directly:

**+49 (0) 171 333 88 26**

or

**+49 (0) 172 660 04 06**

Hotline numbers for other countries can be found in the addresses of each region (see below).

## 12.3 Internet

Additional notes regarding service, maintenance and training, as well as the current addresses of our sales and service offices can be found on

http://www.boschrexroth.com

Outwith Germany please contact our sales/service office in your area first.

## 12.4 Helpful Information

For quick and efficient help please have the following information ready:

- Detailed description of the fault and the circumstances
- Information on the type plate of the affected products, especially type codes and serial numbers
- Your phone and fax numbers as well as your e-mail address so we can contact you in case of questions

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# Notes

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